This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

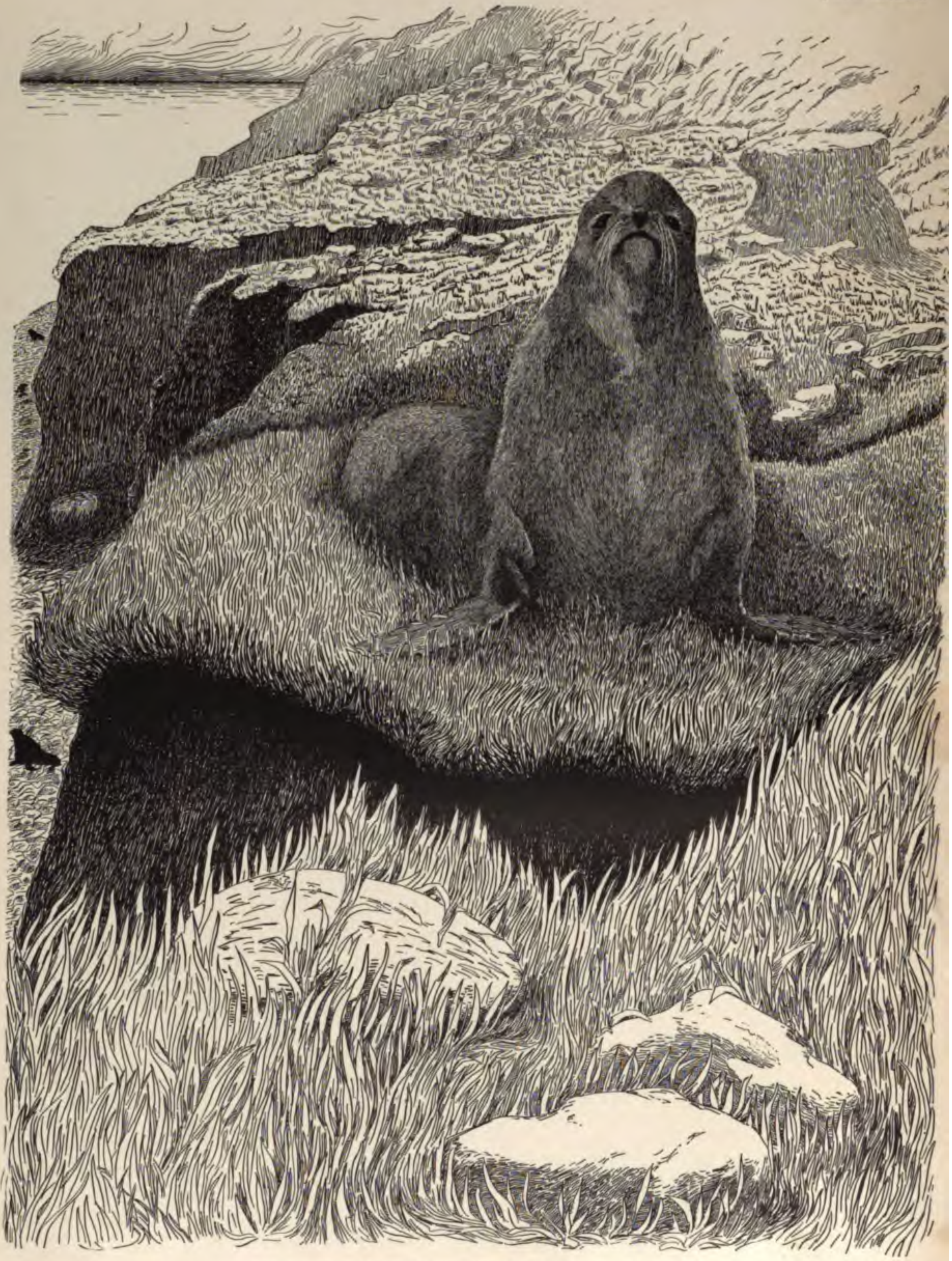
Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

STANFORD UNIVERSITY LIBRARY

Natural History Museum

LIBRARY OF THE
NATURAL HISTORY MUSEUM
STANFORD UNIVERSITY

FRONTISPIECE.



A WAITING BEACH-MASTER, LUKANIN ROOKERY, SAINT PAUL ISLAND.

Drawn from life by Bristow Adams.

LIBRARY OF THE
NATURAL HISTORY MUSEUM
STANFORD UNIVERSITY

THE

FUR SEALS AND FUR-SEAL ISLANDS

OF THE

NORTH PACIFIC OCEAN.

BY

DAVID STARR JORDAN,
President of Leland Stanford Jr. University,
COMMISSIONER IN CHARGE OF FUR-SEAL INVESTIGATIONS OF 1896-97.
[illegible] Treasury [illegible] Commission [illegible] fur-seal investigations

WITH THE FOLLOWING OFFICIAL ASSOCIATES:

LEONHARD STEJNEGER and FREDERIC A. LUCAS,
Of the U. S. National Museum.

JEFFERSON F. MOSER,
Lieutenant-Commander, U. S. N.,
In Command of the U. S. Fish Commission Steamer Albatross.

CHARLES H. TOWNSEND,
Of the U. S. Fish Commission.

GEORGE A. CLARK,
Secretary and Stenographer.

JOSEPH MURRAY,
Special Agent.

WITH SPECIAL PAPERS BY OTHER CONTRIBUTORS.

PART 1.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1898.

599.75
US81

740272

CONTRIBUTORS OF PAPERS ON SPECIAL SUBJECTS.

WILLIAM H. ASHMEAD,
NATHAN BANKS,
O. FULLER COOK,
DANIEL W. COQUILLET,
WILLIAM H. DALL,
WILLIAM R. DUDLEY,
HARRISON G. DYAR,
ELMER E. FARMER,
PIERRE A. FISH,
CHARLES H. GILBERT,
ALBERT HASSALL,
MARTIN LINNELL,
JAMES M. MACOUN,
JENNIE C. MILLER,
WALTER MILLER,
WILLIAM PALMER,
MARY J. RATHBUN,
WILLIAM E. RITTER,
JOSEPH N. ROSE,
EUGENE A. SCHWARZ,
ROBERT E. SNODGRASS,
WILLIAM A. SNOW,
CHARLES W. STILES,
WILBUR W. THOBURN,
FREDERICK W. TRUE.

PART I.

THE HISTORY, CONDITION, AND NEEDS OF THE HERD OF FUR SEALS RESORTING TO THE PRIBILOF ISLANDS.

BY

DAVID STARR JORDAN

AND

GEORGE ARCHIBALD CLARK.

ILLUSTRATED BY PHOTOGRAPHS, AND BY DRAWINGS FROM NATURE BY BRISTOW ADAMS.

TREASURY DEPARTMENT,
Document No. 2017.
Division of Special Agents.

2

FEBRUARY 24, 1898.

SIR: I have the honor to submit herewith my final report as commissioner in charge of fur-seal investigations for the seasons of 1896 and 1897.

Very respectfully, yours,

DAVID STARR JORDAN,
Commissioner.

Hon. LYMAN J. GAGE,
Secretary of the Treasury, Washington, D. C.

TABLE OF CONTENTS.

PART I.

CHAPTER I.—INTRODUCTION: Page.

The occasion of the inquiry ... 17
The act of Congress ... 17
The commission ... 17
The scope of the work ... 18
The investigations ... 19
The report ... 19
Itinerary, 1896 ... 20
Itinerary, 1897 ... 21

CHAPTER II.—HISTORICAL SKETCH:

Discovery and exploration ... 23
Bering's second voyage ... 23
Discovery of Commander and Pribilof islands ... 23
The Russian-American Company ... 23
Its organization ... 24
The ukase of 1821 ... 24
The second and third charters ... 24
The company's management ... 25
Injurious methods ... 25
Protection of females ... 25
The herd at the close of Russian control ... 26
The interregnum ... 26
Professor Dall's notes ... 26
The number of seals killed ... 26
Mr. Howes's notes ... 26
The trading companies ... 26
The work of sealing ... 27
Methods of driving ... 27
Russian methods ... 27
The killing not indiscriminate ... 28
American management ... 28
The Alaska Commercial Company ... 28
The first lease ... 29
The North American Commercial Company ... 29
The present lease ... 29
The decline in the bachelor herd ... 29
Land and sea killing ... 29
The extension of sealing to Bering Sea ... 30
The Tribunal of Arbitration ... 30
The effect of the Regulations ... 30

CHAPTER III.—THE HOME OF THE FUR SEALS:

A. The Pribilof Islands ... 31
  Their geography ... 31
  St. Paul Island ... 31
  St. George Island ... 31
  Otter Island ... 32
  Walrus Island ... 32

CHAPTER III.—THE HOME OF THE FUR SEALS—Continued.

A. The Pribilof Islands—Continued.

Page.
Sivutch Rock 32
The climate 32
No good harbors 32
Vegetation 33
The mammals 33
The birds 33
Inhabitants 33
Conditions in Russian days 34
Conditions in American days 34
The handling of the seals 34
The support of the Aleuts 35
The Government agents 35
B. The fur-seal rookeries 36
The breeding grounds 36
The hauling grounds 36
The St. Paul rookeries 36
Vostochni 36
Morjovi 37
Polovina 37
Lukanin 38
Kitovi 38
Reef 38
Sivutch Rock 38
Gorbatch 39
Ardiguen 39
Spilki 40
Lagoon 40
Tolstoi 40
Zapadni 40
Little Zapadni 40
Zapadni Reef 41
Marunichen 41
The St. George rookeries 41
Zapadni 41
Staraya Artel 41
North 42
Little East 42
East 42

CHAPTER IV.—THE FUR SEAL OR SEA BEAR:

Its relatives 43
The sea bear and true seal 43
The fur seals of the Antarctic 43
The fur seals of the North Pacific 44
Steller's account 44
The three herds 44
The Pribilof herd 44
The Komandorski herd 44
The Robben Island herd 45
Three distinct species 45
Callorhinus alascanus 45
Callorhinus ursinus 45
Callorhinus curilensis 45
The nomenclature of the fur seal 46
The categories of seals 46
The male 46

CHAPTER IV.—THE FUR SEAL OR SEA BEAR—Continued. Page.

The categories of seals—Continued.

The female 46
The bachelor 46
The half bull 47
The idle bull 47
The yearlings and virgins 47
The pups 47
The migrations of the seals 47
Their summer movements 47
The limits of migration 48
Its course and duration 48

CHAPTER V.—THE DAILY LIFE OF THE ROOKERIES:

The arrival at the islands 49
The males 49
Date of earliest arrivals 49
The oldest come first 49
The bachelors 50
Statistics of killings 50
Beginning of the sealing season 50
The arrival of the cows 51
Their incoming gradual 51
Their arrival not the occasion of fighting 52
The method of landing 52
Massed rookery formation 52
Daily rookery counts 53
Synopsis of Kitovi rookery 53
The height of the season 53
Fluctuation of population 54
Amphitheater of Kitovi 54
Increase of families 54
What the height of the season means 54
The period currently misunderstood 55
The birth of the pup 55
The feeding of the cows 55
Swimming seals 55
The seal digests its food in the water 56
The evidence of the pups 56
The fasting of the seals 57
The harem 57
Large harems 57
Harem sizes 58
Harem discipline 58
The departure of the cows 58
Methods of discipline 59
The fighting of the bulls 59
The early fighting overestimated 59
No fighting over arriving cows 60
Fighting influenced by sexual instinct 60
Manner of fighting 61
Real fighting 61
The treatment of the cows 61
The wounds of the fur seal 62
The instinct for fighting 62
The noise of the rookeries 63
The sleeping seals 63

CHAPTER V.—THE DAILY LIFE OF THE ROOKERIES—Continued. Page.

The arrival at the islands—Continued.

Their attitudes 64
The coloration 64
The pelage 65
The stagy season 65
The arrival of the younger seals 66
The breaking up of the breeding season 67
The condition of the bulls 67
The food and feeding grounds 68
The age of the fur seals 68
The fur seal pup 68
The swimming of the pups 69
The excursions of the pups 69
Mortality among the seals 70
Death of pups 70
The parasite, Uncinaria 70
The count of dead pups, 1896 70
Comparative counts 71
The departure of the seals 71
The enemies of the seals 71
The Great Killer 71
The departure of the bachelors and bulls 72
The swimming of the seals 72
The rate of travel 72
Haunts of the southern fur seals 73
Their movements 73
They do not migrate 73
Breeding habits 73
Breeding grounds 74
The fighting of the bulls 74
Difference in time of birth 74

CHAPTER VI.—THE CONDITION OF THE FUR SEAL HERD:

A. Past conditions 75
Acreage measurements 75
Their difficulty 75
Absence of reliable surveys 76
The irregular nature of the ground 76
Chiefly guesswork 76
Magnitude of the problem 76
Early estimates 77
Captain Bryant's estimate 77
The beginning of acreage measurements 77
Elliott's estimate of 1872–74 77
Important assumptions 78
The law of distribution 78
Assumptions incorrect 78
The true law of distribution 78
Uniformity of rookery conditions only apparent 78
Results of Elliott's enumeration 79
The figures unreasonable 79
The methods of enumeration 79
The surveys can not be verified 80
The effect of inaccurate surveys 80
Inadequate unit of space 80
A more rational unit 81

CHAPTER VI.—THE CONDITION OF THE FUR SEAL HERD—Continued. Page.

A. Past conditions—Continued.

The estimate for Kitovi and Lukanin 81
A measure of the overestimate 82
The counts of Mr. Beaman 82
Captain Bryant's note 82
Spilki and Polovina 83
Personal estimates differ 83
Elliott's use of figures 83
Mr. Tingle's estimate 84
The estimate incorrect 84
Elliott's 1890 estimate 84
This estimate unsatisfactory 84
The True and Townsend estimate for 1895 85
The estimate must be doubled 85
It anticipated the season 85
Arbitrary reduction for massed rookeries 85
The estimate revised 86
The important feature of the estimate 86
Mr. Crowley's estimate for 1895 86
Colonel Murray's estimate 87
Defects of this estimate 87
Contrast of estimates for 1895 87
Contrast of acreage measurements 88
Summary of past conditions 88
A reconstruction of earlier estimates 88
The earlier and later quotas 88
The quota dependent upon the breeding herd 88
Estimates of non-breeding seals 89
The reconstruction still only an estimate 89
Completed estimate 89
B. Present conditions 90
The census 90
Its difficulty 90
Actual counts 90
Kitovi rookery taken as typical 91
Census of harems and cows 91
Original counts for St. George 91
Estimate for St. George 91
This estimate unsatisfactory 92
The great excess of pups 92
Count of pups 92
Correction for absent cows 93
Summary of breeding seals 93
Revision of census of 1896 93
Corrections on St. George 93
Corrections on St. Paul 94
Sivutch Rock 94
The important error in the census of 1896 94
Revised census of 1896 95
The value of this census 95
The census of 1897 96
The count of pups in 1897 96
Comparison of counts of cows and pups 96
Proportion of cows to pups 96
Average harem of Kitovi 97
Census of 1897 97

Page.
[illegible] 97
[illegible]

CHAPTER VII.—THE DECLINE OF THE HERD—Continued. Page.

The evidence of decline—Continued.

The quota of 1897 harder to get 114
The quota a direct measure of breeding herd 114
The quota of 1897 and the Paris regulations 114
The total decline in the herd 114

CHAPTER VIII.—THE CAUSE OF THE DECLINE:

Joint agreement of 1892 115
No competent natural cause 115
Natural causes of mortality constant 115
The real cause an artificial one 116
Land and sea killing 116
A. Land killing—its methods 116
Animals killed 116
Killing season 116
The driving 116
The drive 117
The killing 118
The Aleuts 118
The skinning of the seals 119
Division of labor 119
Treatment of the skins 119
The effects of land killing 119
Removal of superfluous male life beneficial 120
Possibility of overkilling 120
A hypothetical case 120
Such killing not practicable 121
Otter Island not driven 121
Defective skins 121
Overkilling of males has not occurred 121
Statistics of the quota 122
Land killing, 1870–97 122
Voluntary reduction of quota, 1876–77 122
Voluntary reduction, 1882–83 122
No dearth of male life 122
Killing of males not a factor in decline 123
Premature killing 123
Anticipation of quota 123
Table showing date of filling quota, etc 123
The killing of undersized seals 124
Such killing did not affect the herd 124
Premature killing wasteful but not injurious 124
Killing of pups wasteful 124
Absence of injury to the herd 125
Methods on the Commander Islands 125
Dr. Stejneger's observations 125
The dearth of male life on Bering Island 125

CHAPTER IX.—THE THEORY OF OVERDRIVING:

Driving and its supposed results 126
The process of driving 126
The animal driven 127
The theory intangible 127
Its logical conclusion 127
The drives and driveways 128

CHAPTER IX.—THE THEORY OF OVERDRIVING—Continued.

Page.
The Russian drives 128
The drive from Northeast Point 128
The American drives 128
The drives greatly shortened 129
Reef driveway 129
The character of the route 129
The length of the drive 130
Comparison of drives 130
The Commander driveways 130
  Zapadni 130
  Palata 131
No evil results from these drives 131
Care exercised in driving 131
The fur seal not ill-adapted to land travel 131
The "carcass-strewn" driveways 132
Fatalities on the drives 132
Injuries to bachelors could not affect herd 132
The impossibility of sexual injury 133
Voluntary movements of the males 133
Driving not a factor in the decline 133

CHAPTER X.—ALLEGED POSSIBLE CHANGE OF HABITS:

Migration to Commander Islands 134
The fixity of habits 134
The seal's low intelligence 134
Contact with man has had no effect 135
Alteration of conditions 135
The bachelors of Bering Island 135
Arbitrary selection of males 136
The effect of decline 136
Possibility of driving the seals elsewhere 136
The abandonment of Spilki 137
The presence of the village not the cause 137
Exposed condition of Lagoon rookery 137
The real cause of the abandonment 137
Origin of Lagoon and Spilki 138
Abandonment of Marunichen 138
Elliott's theory for Sivutch rookery 138
Sivutch overlooked in 1872-1874 138
The notions of the Aleuts 139
These notions shared by Government agents 139
The policy of seclusion detrimental 140
Intelligent inspection not wanton invasion 140
Inspection not harmful 140
Relations of man have not affected the seals 141

CHAPTER XI.—PELAGIC SEALING, OR KILLING AT SEA:

The nature of pelagic sealing 142
The hunting of the Indians 142
Introduction of white men and vessels 142
The expansion of the industry 142
The use of firearms 143
The modus vivendi 143
The regulations of the Paris award 143
The sealing vessels 143
Methods of sealing 144
The seals as found 144
Methods of capture—the spear 144

CHAPTER XI.—PELAGIC SEALING, OR KILLING AT SEA—Continued.

Page.
The shooting of the seals 144
Loss resulting from shooting 145
The spear least wasteful 145
Northwest Coast sealing 146
Bering Sea sealing 146
Pelagic catch 146
Does not include seals killed, but lost 147
Early sealing confined to Pribilof herd 147
Suspension of land killing 147
Modus vivendi transferred sealing to Asiatic side 147
Decline of the catch 148
Unfavorable weather not the cause 148
Pelagic killing and land killing compared 148
Statistics regarding land and sea killing 149
The period from 1871–1882 149
Growth of the catch 149
Relation of gains and losses in the herd 149
Period subsequent to 1882 150
Expansion of pelagic; decrease of land sealing 150
Cause of decline to be sought in breeding herd 150
The beginning of the decline 151
Early pelagic sealing a mere check 151
Irregular quota since 1890 151
Pelagic sealing and the Commander herd 152
Interrelation of pelagic and land catches 153

CHAPTER XII.—THE EFFECT OF PELAGIC SEALING:

Pelagic sealing kills females 153
Pelagic sealing and the sealing of the South Seas 153
Methods of southern sealing 153
"Indiscriminate" not "excessive" 154
The preponderance of females 154
The sealing captains' record of sexes taken 154
Customs-house examination by experts 155
Contrast of sex returns 155
The sex of salted skins easily determined 155
Investigations of Alexander and Halkett 155
Females more easily taken 156
The capture of males not important 156
Possibility of equilibrium 156
Equilibrium a theoretical fact 157
Death from old age 157
A hypothetical case 157
Possible abstraction of females 157
Secondary loss of pups 158
Pelagic catch still involves 16 per cent 158
Pelagic catch must still fall to one-third before equilibrium 158
The equilibrium could not be maintained 159
Equilibrium exists only far below commercial ruin 159
Destruction of unborn pups 160
Females pregnant and nursing 160
Pelagic sealing takes compound interest 160
Destruction of nursing pups 160
Pups dependent upon milk until December 160
The absence of excrement 161
The supposed nonfeeding of females 161

CHAPTER XII.—THE EFFECT OF PELAGIC SEALING—Continued. Page.

Absence of food in stomachs 161
The seal digests its food in the water 162
Absurd theory of indiscriminate nursing 162
Fur-seal mother and pup 162
Mistaken observations 162
Supposed self-feeding of pups 163
The absurdity of the theory 163
Determination of the matter by killing pups 163
Pups absolutely dependent upon mothers' milk 164

CHAPTER XIII.—THE STARVATION OF PUPS:

The count of starved pups 165
Beginnings of starvation 165
Notes on starving pups 165
  The hungry pup 166
  The breaking down 166
  The death of the starveling 166
Difficulty of distinguishing early dead pups 166
Many early dead pups disappear 167
Starving pups 167
The work of the foxes 167
Dead pups, St. George Island 167
Reconstruction of St. George estimates 168
The detailed estimate 168
Pup statistics 169
The count of starved pups in 1897 169
The removal of the early dead 170
Estimate of starved pups for 1897 170
Importance of these figures 170
Destructive effects of pelagic sealing established 170
The cumulative effect 171
Total effect of pelagic sealing 171
The effect since 1883 171
The effect under the Paris regulations 172

CHAPTER XIV.—EFFECT OF PELAGIC SEALING ON THE SEAL SKIN INDUSTRY:

International interest in the fur seals 173
United States interests 173
Russian interests 174
The interest of Great Britain 174
Canadian pelagic sealing interests 174
Valuation of the fleet 174
Pelagic sealing suicidal 175
Effect of the declining catch 175
Legality of pelagic sealing 175
Prohibition to Americans 176
Distinctly a Canadian industry 176

CHAPTER XV.—THE RESULTS OF THE PARIS AWARD:

A. The arbitration 177
  The origin of the fur seal question 177
  The seizure of vessels 177
  Efforts to secure international action 177
  Proposed measures of protection 177
  Objection by Canada 178
  Renewal of negotiations 178
  The counter proposition unsatisfactory 178
  Proposals for arbitration 178

CHAPTER XV.—THE RESULTS OF THE PARIS AWARD—Continued. Page.

A. The arbitration—Continued.

The modus vivendi 179
The joint commission of inquiry 179
The tribunal 179
The joint report of the commission 179
The American contention 180
The British contention 180
Their comparative merits 180
B. The regulations 180
The minor provisions 180
The sixty-mile zone 181
The close season 181
Regulations adapted to work of sealers 181
The cost of enforcing the regulations 182
The failure of the regulations 182
The redeeming feature of the regulations 182
The purpose of arbitrators 183
The obligation to protect and preserve 183

CHAPTER XVI.—SUMMARY OF CONCLUSIONS:

Statements of fact 184-186

CHAPTER XVII.—THE REMEDY FOR THE DECLINE OF THE HERD:

Revision of the regulations not adequate 187
Pelagic sealing can not exist without the killing of females 187
Total prohibition of pelagic sealing the only remedy 187

CHAPTER XVIII.—THE FUTURE OF THE HERD:

A reconsideration of the question 188
A basis for the reopening of the subject 188
Findings of fact—the decline 188
Slow rate of increase in the herd 188
Males can be killed with impunity 189
Excessive destruction of females 189
Compromise findings 189
The herd commercially ruined 189
Pelagic sealing incompatible with preservation 189
The skin of the female to be contraband 190
The proposed extermination by slaughter on the rookeries 190
Importance of the fur seal herd 190
A strong nucleus remains 190

CHAPTER XIX.—RECOMMENDATIONS:

Inadequacy of past knowledge 191
The Government agents not investigators 191
Failure to understand conditions 191
The wild-animal policy 192
Lack of faith in our methods 192
Wasteful management 192
The two vital questions yet unknown 192
The fixing of the quota 193
Questions which require continuous study 193
A fixed quota not desirable 194
The proportion of males needed 194
Minor problems 194
The herd should be placed in charge of a naturalist 194
APPENDIX I.—Statistics 197
Table of killings 197-207
Summary of totals 207

APPENDIX I.—Statistics—Continued. Page.
- Killings, Northwest Point-Zapadni 207
- Total seals killed—accepted, rejected 208-209
- Killings, 1896 209
- Killings, 1897 210
- Statistics of land and sea killing 211
- Daily counts of cows 212
- Comparative census 213
- Pup statistics, 1896 213
- Dead pups, 1897 214
- American fur-seal catch, 1894 215
- Canadian fur-seal catch, 1894 216
- American and Canadian catch, 1895 217
- American and Canadian catch, 1896 219
- American and Canadian catch, 1897 220-221
- Statistics of pelagic catch 222-225
- Percentage of females 225
- Value of pelagic fleet 226
- Cape Horn seals 226
- Lobos seals 226

APPENDIX II.—Documents.
- Modus vivendi 227
- Arbitration treaty 228-231
- Award of the tribunal 231-234
- The regulations 234
- Declarations 236
- Alaska Commercial Company's lease 236
- North American Commercial Company's lease 238
- The conference of fur-seal experts 240
- Joint statement of conclusions 241
- Furriers' affidavits regarding sex 244
- The law prohibiting sealing by Americans 246

APPENDIX III.—Illustrations 247

CHAPTER I.

INTRODUCTION.

THE OCCASION OF THE INQUIRY.

The present inquiry into the condition and needs of the fur-seal herds of the North Pacific Ocean and Bering Sea is the outgrowth of a belief on the part of the United States that the regulations formulated by the Paris Tribunal of Arbitration for "the protection and preservation of the fur seal" had failed to accomplish their avowed object. The inadequacy of these regulations was apparent at the close of the first season of their operation, and each succeeding season has only rendered it more conspicuous. Failing to secure the cooperation of Great Britain in the immediate revision of the regulations, the United States in the spring of 1896 accepted the proposal of Great Britain for a scientific investigation of the whole subject, to be made independently by each nation, the results of such an investigation to form the basis of a reconsideration of the regulations at the end of the specified trial period ot five years.

THE ACT OF CONGRESS.

The act of Congress under which the present commission of investigation for the United States was organized is as follows:

> *Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Treasury be, and is hereby, authorized to expend, from any moneys in the Treasury not otherwise appropriated, a sum sufficient to provide for the employment of persons to conduct a scientific investigation, during the fiscal years eighteen hundred and ninety-six and eighteen hundred and ninety-seven, of the present condition of the fur-seal herds on the Pribilof, Commander, and Kuril islands in the North Pacific Ocean and Bering Sea, said amount not to exceed for both said years the sum of five thousand dollars.
>
> The Secretary is also authorized to employ a stenographer in connection with this investigation at a rate of compensation not exceeding one thousand five hundred dollars per annum, and to pay his compensation and expenses out of any moneys in the Treasury not otherwise appropriated.
>
> The President is authorized to detail, for the purposes of assisting in this investigation, any officer or officers or employees of the United States Government, their actual expenses and the expenses of the person or persons employed under the preceding paragraph to be paid by the Secretary of the Treasury out of any moneys in the Treasury not otherwise appropriated.
>
> The President may detail a vessel of the United States for the purpose of carrying out this investigation.

THE COMMISSION.

In accordance with the above act, Dr. David Starr Jordan, president of Leland Stanford Junior University, was appointed commissioner in charge of the investigation, and with him were detailed as associates Lieut. Commander Jefferson F. Moser, commanding the United States Fish Commission steamer *Albatross;* Dr. Leonhard

Stejneger, curator of reptiles, United States National Museum; Mr. Frederic A. Lucas, curator of comparative anatomy, United States National Museum, and Mr. Charles H. Townsend, naturalist of the *Albatross*. Mr. George Archibald Clark, president's secretary of Stanford University, was appointed secretary to the commission, and Col. Joseph Murray, of Fort Collins, Colo., formerly United States Treasury agent at St. Paul Island, and reappointed in 1897 to the same position, was made special assistant.

Great Britain named as her commission of investigation Prof. D'Arcy Wentworth Thompson, of University College, Dundee, Scotland; Mr. Gerald E. H. Barrett-Hamilton, of Dublin, Ireland, and Mr. James Melville Macoun, of the Geological Survey of Canada. The Canadian government detailed Mr. Andrew Halkett to make special investigation of the operations of the pelagic fleet.

THE SCOPE OF THE WORK.

In his letter of instructions to the commission, under date of June 13, 1896, Hon. Charles Sumner Hamlin, then Assistant Secretary of the Treasury, outlined the general scope and purpose of the investigation, as follows:

> Your final report will be expected to relate more specifically to the group of seals which resort to the Pribilof Islands, but the Asiatic herd may be investigated to such extent as seems advisable in order to afford the opportunity for instituting comparisons from which important deductions may be reached.
>
> The principal object of this investigation is to determine by precise and detailed observations, first, the present condition of the American fur-seal herd; second, the nature and imminence of the causes, if any, which appear to threaten its extermination; third, what, if any, benefits have been secured to the herd through the operation of the act of Congress and act of Parliament based upon the award by the Paris Tribunal of Arbitration; fourth, what, if any, additional protective measures on land or at sea, or changes in the present system of regulations as to the closed season, prohibited zone, prohibition of firearms, etc., are required to insure the preservation of the fur-seal herd.
>
> Your inquiries should furthermore be extended, in so far as the time and circumstances permit, to embrace the consideration of all important questions relating to the natural history of the seals, both at sea and on the islands, with special reference to their bearing upon the sealing industry.

To this general plan of inquiry was appended the following list of specific questions:

> 1. The effect of pelagic sealing in the North Pacific Ocean and Bering Sea upon the fur-seal herd, due account being taken of the classes of seals killed.
>
> 2. What effect, if any, has the annual removal of bachelor seals, which has taken place on the Pribilof Islands, had upon the fur-seal herd?
>
> The solution of these two questions involves a study of the entire subject of the regulations of the two sexes and the proportion of the male seals required to be preserved in order to maintain the stability of the herd.
>
> 3. Whether killing on land or sea has interfered with the regular habits and occupation of the islands by the herd, or has operated to reduce the strength of the seal race as a whole by a natural selection.
>
> 4. The propriety of existing methods of driving seals from the hauling grounds to the killing grounds, culling, and other practices connected therewith.
>
> 5. The cause of the destruction of nursing pups upon the islands.
>
> During the seasons of 1894 and 1895 about 20,000 and 30,000 dead pups, respectively, were found upon the islands. You should specially consider the causes of their death, whether from starvation or other cause, preserving specimens whenever practicable.
>
> 6. The extent, date, and cause of mortality on the islands of seals of all classes.

7. The breeding habits of the seals, with special reference to the age at which the females begin or cease to breed, and the frequency of the breeding, whether annually or at longer intervals.

8. The condition of female seals taken at sea, as to nursing and pregnancy.

9. The distance which the several classes of seals go from the islands and the directions which they take in search of food or rest at different times during the season.

10. The actual decrease, if any, in the number of seals in each class on the Pribilof Islands which has occurred during the past year, and also since the year 1890, and since the year 1870. A careful census of the rookeries should be taken this season for comparison with the enumeration made in 1895 and previous years.

11. An examination of the question as to the character of the food of fur seals.

12. Whether the Pribilof Island herd of fur seals intermingle with the Asiatic herds of the Commander or Kuril islands.

13. Whether nursing seals nurse other than their own pups on the islands.

THE INVESTIGATIONS.

Acting under these instructions the commission of investigation have made a detailed inspection and study of the habits, condition, and needs of the Pribilof Islands herd, with a comprehensive and almost equally exhaustive study of the herds of the Commander and Kuril islands. The main results of our investigations for the season of 1896 have already been published by the Treasury Department in the form of a preliminary report.*

The work during the season of 1896 was sufficient to prove the depleted condition of the herd and to point out the cause of its threatened destruction. It, however, showed clearly that all preceding calculations as to the number of seals resorting to the Pribilof Islands were useless for purposes of comparison, being grossly exaggerated in the early years of American control, and as largely underestimated in the later years through a misapprehension of the actual conditions of rookery life. It therefore became impossible to form an accurate estimate of the relative conditions of the breeding herd or of the rate of its decline. The work of investigation was therefore continued during the season of 1897, and its supplemental results have been embodied in condensed form in a second preliminary report† which has recently been published by the Treasury Department. It now remains for us to bring into the shape of a final report the completed results of our labors. In accordance with the broad scope of our instructions we have endeavored, so far as opportunity afforded, to consider "all important questions relating to the natural history of the seals, both at sea and on the islands," and the work has therefore become very voluminous.

THE REPORT.

This report naturally falls into four parts or divisions. In Part I the main phases of the fur-seal controversy have been taken up and discussed at length, such historical matters as seem necessary for a clear understanding of the matter being added. In this general discussion the results of more detailed studies on special topics, which appear in Part III, are freely used and the original studies referred to for more complete information. Part I, therefore, becomes a complete report in itself of the investigation so far as the general condition, needs, and possibilities of the Pribilof Islands herd of fur seal are concerned.

---

* Observations on the Fur Seals of the Pribilof Islands, Jordan, 1896.

† Second Preliminary Report of the Bering Sea Fur-Seal Investigations, Jordan, 1897.

In Part II is given the minute and detailed journal of daily observations of the members of the commission. This record, being the chief basis for the conclusions in the general report, becomes a most important part of the work. To it is appended an abstract of the record in the log of St. Paul Island for the past twenty-seven years, in so far as it pertains to the life history, and habits of the seals.

The third division of the report contains the series of special papers and reports, already referred to, which deal with various phases of the life history, movements and the surroundings of the seals, and which have been prepared by different members of the commission and by various specialists. These take up in minute detail such phases of the subject as have important bearing on the fur-seal question.

In Part IV are included the reports for the seasons of 1896 and 1897 by Dr. Stejneger on the Commander and Kuril islands, which form a continuation of his more extended investigations in the season of 1895, the results of which have already been published.* To the reports on the Commander herd such reference as has been necessary to throw light upon the condition of the Pribilof herd have been made in the general discussion.

ITINERARY, 1896.

The United States Fish Commission steamer *Albatross*, with the American commission and Professor Thompson and Mr. Macoun, of the British commission, left Seattle on the morning of June 24, arriving at St. George Island, Bering Sea, on the afternoon of July 8. July 9, 10, and 11 were spent in and about this island making general observations, photographing the rookeries, and counting the breeding seals. The time between July 12 and 18 was occupied in similar work on St. Paul Island.

July 18 the *Albatross* steamed for Unalaska, leaving Mr. Townsend there and taking Dr. Stejneger to the Commander Islands. July 30 to August 9 were spent about these islands, August 22 to 26 about the Kurils, and August 28 to September 2 about Robben Island, reaching Hakodate, Japan, September 10.

On July 28 Mr. Lucas, Professor Thompson, and Colonel Murray visited St. George Island, the first two returning to St. Paul on August 5. Mr. Townsend returned from Unalaska August 8, and he and Mr. Lucas spent the time until the 12th at sea, on board the *Rush*, boarding vessels of the sealing fleet.

August 8 to 14, inclusive, was occupied in counting dead pups on St. Paul. A similar count was made by Mr. Lucas and Mr. Macoun August 16 to 21 on St. George.

On August 16 Professor Thompson and Dr. Jordan left St. Paul Island in H. M. S. *Satellite* for the Commander Islands, spending August 24 and 25 on the rookeries of these islands and returning to St. Paul on September 1, bringing with them Mr. Barrett-Hamilton, another member of the British commission.

Mr. Townsend left St. Paul on the company's steamer *Homer* for San Francisco August 23. Colonel Murray returned from St. George September 1 and on the following day made experiments in branding pups on Lukanin rookery. Messrs. Lucas and Barrett-Hamilton spent September 2 to 5 at sea on the *Rush*, among the pelagic sealers.

---

*The Russian Fur Seal Islands, Stejneger; Bull. U. S. Fish Com., 1896.

On September 8 Dr. Jordan, Professor Thompson, and Mr. Lucas sailed with the *Rush* for Sitka and thence to Seattle, Messrs. Clark, Macoun, Barrett-Hamilton, and Colonel Murray remaining on St. Paul.

On September 11 further experiments in branding were made. The starved and starving pups on St. Paul were counted September 28 to October 1. A similar count was made on St. George October 6. On October 7 Messrs. Clark and Macoun returned to St. Paul, Mr. Barrett-Hamilton remained on St. George, and Colonel Murray went to Unalaska. On October 22 the remaining commissioners left the islands on the *Bear* and arrived in Port Townsend November 3.

ITINERARY, 1897.

May 22.—Mr. Clark sailed from San Francisco on the North American Company's steamer *Del Norte* May 22. Mr. Bristow Adams accompanied him as artist assistant to the commission. Col. Joseph Murray, chief agent, Mr. John M. Morton, assistant agent, and Mr. James M. Macoun, Canadian commissioner, were also passengers on the vessel. The *Del Norte* arrived at Wood Island, Kadiak, May 31, and at Dutch Harbor, Unalaska, on the morning of June 4.

June 7.—The *Del Norte* arrived at St. George Island, remaining at anchor discharging cargo until the evening of the 11th, during which time all the rookeries of St. George were visited and daily visits were made to North rookery, near the village.

June 12.—On the morning of June 12 Mr. Clark was landed on St. Paul Island and began daily observation of the breeding rookeries.

July 1.—Mr. Lucas arrived on the *Rush* at St. Paul July 1, Dr. Stejneger, who accompanied him to Unalaska, having sailed direct from that port for the Commander Islands on board the *Grant*.

July 7.—Dr. Stejneger was landed by the *Grant* on Bering Island.

July 9.—Mr. Lucas examined the rookeries of St. George Island. Mr. Chichester accompanied him and photographed the rookeries for the United States Fish Commission.

July 12.—The counting of the cows was begun on the rookeries of St. Paul and the series of photographs for the United States Fish Commission made.

July 25.—Dr. Jordan arrived at St. George Island and, after visiting the rookeries there, was landed on St. Paul July 28.

July 30.—The count of live pups was begun on the test rookeries. Kitovi was counted by Messrs. Clark and Macoun on August 2. This was followed by a count of dead pups on the "death traps" of Zapadni and Tolstoi.

August 5.—Professor Thompson arrived at St. Paul on H. M. S. *Rainbow* from the Commander Islands.

August 8.—Mr. Macoun left St. Paul on H. M. S. *Pheasant.*

August 11.—Dr. Jordan and Mr. Clark left St. Paul Island on the revenue-cutter *Rush*, arriving at Seattle in the evening of the 21st.

August 15.—Dr. Stejneger was transferred from Bering Island to Copper Island on the Russian cruiser *Koreets.*

August 16.—Professor Thompson left the Pribilof Islands on H. M. S. *Amphion.*

August 18.—Mr. Lucas left St. Paul on the *Del Norte*, arriving in San Francisco August 31.

August 31.—Dr. Stejneger returned to Bering Island by the Russian cruiser *Yakut*, leaving immediately for Petropaulski, where he arrived on September 4.

September 2.—Seals were driven from Reef, Lukanin, and Middle Hill and retained in the Lagoon inclosure until the 9th.

September 9.—Beginning with this date Colonel Murray, on St. Paul, and Mr. Judge, on St. George, branded fur-seal pups.

September 11.—Mr. Farmer and assistants in the work of electrical branding left St. Paul Island on board the revenue-cutter *Perry*.

September 27.—Dr. Stejneger made a final visit to Bering Island to investigate the starvation of pups, returning to Petropaulski on October 20, sailing thence homeward by way of Japan.

October 15.—Colonel Murray made a final counting of starved pups on Lukanin and Kitovi rookeries of St. Paul Island.

A more minute daily record of investigations will be found in connection with the journal of daily observations kept by the commission, and which appears in full elsewhere in this report.

CHAPTER II.

HISTORICAL SKETCH.

DISCOVERY AND EXPLORATION.

The early discoveries and explorations in and about the waters of Bering Sea followed as a result of the occupation of the eastern coast of Siberia by the Russians in the latter part of the seventeenth century. The organized efforts to explore the unknown seas beyond were begun in the reign of Peter the Great and were completed after his death by his successor, the Empress Catherine.

The first important expedition sailed in two vessels from Kamchatka in 1728 under charge of Vitus Bering. One vessel discovered St. Lawrence Island and sailed through the straits to the north; the other reached the continent of North America near the mouth of the River Yukon.

BERING'S SECOND VOYAGE.

Thirteen years afterwards Bering set out with a second expedition which reached America at Kayak Island, in the vicinity of Mount St. Elias. Upon the homeward voyage the Commander Islands were discovered, and the ship on which Bering sailed was wrecked on the island now called Bering. Here Bering died, and, after wintering, such of the crew as survived made their way to Kamchatka in the spring under the direction of the famous naturalist, Georg Wilhelm Steller.

DISCOVERY OF COMMANDER AND PRIBILOF ISLANDS.

This second voyage in 1741, making known the valuable fur resources of the Commander Islands, stimulated the fur trade and led to many expeditions among the islands of the Aleutian chain in search of other regions inhabited by fur seals. During these voyages the herd of seals now known to resort to the Pribilof Islands were encountered on their migrations through the passes of the Aleutian Islands, and efforts were made to ascertain the shore to which they belonged. They were followed to the northward and to the southward for this purpose, but without result until, in 1786, Gerassim Pribilof, a navigator in the employ of one of the Russian trading companies, finally succeeded in finding the group of islands which now bear his name and are the home of the American fur seals. The island of St. George, so called from the name of his vessel, was the first land found. In the following year St. Paul Island was discovered.

THE RUSSIAN-AMERICAN COMPANY.

Immediately upon the discovery of the Commander Islands in 1741, and later upon the discovery of the Pribilof Islands in 1786, numerous trading companies began to develop their lucrative fur resources. The rivalry and competition which naturally arose nearly resulted in the destruction of the fur-seal herds. To prevent this, the entire fur trade of the Russian colonies passed into the control of a single powerful organization, the Russian American Company. This company was created in the year 1799, by decree of the Imperial Government, and was vested for a period of twenty years with exclusive privileges to trade along the shores of northwestern America, between latitude 55° north and Bering Strait, in the Aleutian and Kuril Islands, and the islands of the Northeastern or Bering Sea.

ITS ORGANIZATION.

The company's chief place of business was originally at Irkutsk, but was afterwards transferred to St. Petersburg. Its shareholders consisted of Russians, numbered members of the Imperial family and the higher nobility. For purposes of administration the Imperial Government [illegible] appointed a chief manager, who resided at Sitka, Alaska, then called New Archangel. The powers of this manager were [illegible] the territory over which the company exercised jurisdiction. Under [illegible] agents, overseers, and other agents. Reports of the company's affairs were [illegible] the Imperial Government. Under its charter the Russian American Company paid [illegible] or rental to the Government, but as [illegible] the exchange of furs for teas on the Chinese frontier, the Government [illegible] large sums through the resulting duties.

THE UKASE OF 1821.

On the 4th of September, 1821, [illegible] issued an edict known as the ukase of 1821 [illegible] regulations [illegible] defining the boundaries of [illegible] within which the Russian-American Company [illegible]. These [illegible] provided for the prohibition of [illegible] within 100 Italian miles of the coasts [illegible] after the issuance of this decree the Emperor [illegible] the charter of rights and privileges [illegible]

The ukase of [illegible] land with the United States [illegible] in the treaties of 1824 and 1825 [illegible] Russia and the latter between Great Britain [illegible] control claimed by Russia [illegible] Russian territory [illegible] Kamchatka, as well as all [illegible]

[illegible] CHARTERS.

The second [illegible] in 1821 to continue to the [illegible] It was again renewed [illegible] franchises and privileges. The [illegible] company, however, continued [illegible] but before [illegible] transferred to the United [illegible]

[illegible]

THE COMPANY'S MANAGEMENT.

At once upon assuming control of the islands the Russian-American Company put a stop to the ruthless slaughter which threatened the fur-seal herds with destruction. They, however, attempted to limit the extent rather than to reform the character of the slaughter. They still continued to kill males and females alike. The injury to the herd naturally continued, and in 1806 and 1807 it was found necessary to suspend killing in order to give the herd an opportunity to recuperate. In 1808 killing was resumed, but still without proper regard for the conditions of seal life.*

INJURIOUS METHODS.

Gradually, however, the habits and interests of the herd began to be better known and cared for. In 1820, Yanovsky, an agent of the Imperial Government, after an inspection of the fur-seal rookeries, called attention to the practice of killing the young animals, leaving only the adults as breeders. He writes: "If any of the young breeders are not killed by the autumn they are sure to be killed in the following spring."† From this course of action he concludes that the industry decreases every year in volume, and may in the course of time be extinguished entirely. Probably as a result of this, in 1822, as Veniaminof tells us, provision was made for the reservation of young seals for breeding purposes. This provision was hardly sufficient, however, to accomplish the desired end so long as females of any age were killed. As a natural result, another crisis in the history of the herd was reached in 1834. But it is not clear whether this was due entirely to indiscriminate slaughter or to the combination of this with disaster resulting from the continuance of the ice floes about the islands far into the summer, preventing the cows from landing to give birth to their young and grinding them to pieces in the ice itself. This latter possibility exists as a tradition among the Aleuts, though in their minds it may have been confused with a subsequent catastrophe of a similar character recorded by the manager of St. Paul Island in 1859.‡ In any event, it seems very clearly established that in the year 1834 the herd was in a most precarious condition. The natives were not even allowed to take seals for food, and for a time all killing was suspended.

PROTECTION OF THE FEMALES.

At this time it seems to have become fully understood that if the herd was to continue its females must be protected.§ Accordingly from this time on the taking of seals was limited strictly to the males. But the managers of the fur-seal herds had still something to learn. The requirements of the Chinese market were the only guide to the class of skins desired, and as all sizes were taken the killing of males included all ages from old bulls down to the gray pups. Gradually this wasteful killing stopped. The bulls were no longer taken and the killing of gray pups was limited to such as were needed for food and oil.‖

---

* Veniaminof, Trans. Elliott, Monograph, Fur Seal Isds., 1881, p. 140.

† Appendix to case of U. S., Fur Seal Arb., Letter No. 6, p. 58.

‡ Appendix to case of U. S., Fur Seal Arb., Letter No. 29, p. 87. The dire results here predicted seem not to have been felt by the herd.

§ Appendix to case of U. S., Fur Seal Arb., Letter No. 23, p. 82.

‖ Appendix to case of U. S., Fur Seal Arb., Letter No. 24, p. 82.

THE HERD AT THE CLOSE OF RUSSIAN CONTROL.

Under these gradually perfected methods of operation the herd seems to have prospered and increased so that in the year 1864, as we learn from the instructions* to the agents of the Russian-American Company on the islands it was considered possible to take annually 70,000 seals on St. Paul Island alone. The number for St. George Island is not given. This in brief is the condition of the fur-seal herd as it came into the possession of the United States. In definite facts and data there is but little; but it may be taken for granted in the light of subsequent events that the herd was in a condition of normal increase.

THE INTERREGNUM.

The year 1868, or the season following the transfer of Alaska from Russian to American control, is generally known as the "interregnum." It was impossible immediately to provide an administrative system for the Territory, and a period of lawlessness reigned on the islands. The state of affairs is thus described by Prof. William H. Dall,† who visited the islands during the year:

PROFESSOR DALL'S NOTES.

During my visit to St. George Island in 1868, this vast territory of Alaska had just fallen into the possession of the United States, and the Government had not yet fairly established more than a beginning of an organization for its management as a whole, without mentioning such details as the Pribilof Islands. In consequence of this state of affairs private enterprise, in the form of companies dealing in furs, had established numerous sealing stations on the islands. During my stay, except on a single occasion, the driving from the hauling grounds, the killing, and skinning was done by the natives in the same manner as when under the Russian rule, each competing party paying them so much per skin for their labor in taking them. Despite the very bitter and more or less unscrupulous competition among the various parties, all recognized the importance of preserving the industry and protecting the breeding grounds from molestation, and for the most part were guided by this conviction.

THE NUMBER OF SEALS KILLED.

During this year a very great number of seals were killed on the islands. Estimates vary, but it is evident that the number amounted to not far from 300,000. As this subject has been frequently referred to and strenuous efforts made to connect the heavy killing of this year with the subsequent decline of the herd, we feel justified in quoting here at length the statement of Mr. Osborne Howes, now editor of the Boston Herald, who spent the summer of 1868 on St. George Island as agent of one of the companies. He says:

MR. HOWES'S NOTES.

I left San Francisco early in March on board a schooner cleared by Messrs. Parrott & Co., of that city, for a trading voyage in Bering Sea and the coast of Kamchatka. Our schooner put into Sitka on the way up and took on board a number of natives, sailing from Sitka to the Shumagin Islands and thence into Bering Sea. It was the first vessel to reach the island, arriving at St. George in the latter part of April. I was landed with the goods, and the schooner continued her voyage toward the coast of Kamchatka. I immediately secured possession of the salt house and the services of the natives for the season.

---

*Appendix to Case of U. S., Fur Seal Arb., Letter No. 31, p. 89.

†Fur Seal Arb., vol. 2, p. 152.

THE TRADING COMPANIES.

In a few days a schooner representing the firm of Hutchinson, Kohl & Co. also landed representatives on St. George Island. Not long after the arrival of this second schooner a third, in the interest of the firm of Williams & Haven, landed men on the opposite side of the island, at Zapadni rookery. This firm had headquarters on St. Paul Island. It was impossible for these separate interests to carry on their operations independently, and they therefore placed their business under my charge. Drives were made alternately for the different companies and the natives employed in turn.

Before the season was well under way a fourth expedition was landed on the south side of the island across the point from East rookery. There were three men in the party, and they set about killing the seals on the rookery without driving them. The natives objected to this because it involved the killing of females. The men were remonstrated with, but were obdurate. One was bribed off by the promise of double wages, but the other two continued their work. They were finally taken prisoners and sent off to Sitka by the first schooner that touched at the island. With them were returned the men brought from Sitka, who were found to be unsuited for the work. When the captain of the schooner whose men were interfered with arrived in the fall for his cargo of skins he was pacified by being allowed to take the results of one big drive made by the natives for his benefit.

THE WORK OF SEALING.

The work of sealing was carried out by the natives under the direction of their chief. Representatives of the different companies did not concern themselves with the work of driving or killing. They simply paid the natives so much per skin—30 to 35 cents—payment being made in trade goods. The natives evidently followed the traditions of earlier days in their work. They seemed very jealous and careful of the seals, avoiding any disturbance of the breeding grounds. Their objection to the methods of killing on East rookery was based upon the ground that if the females were killed there would be no seals in the years to come. It is my belief that not a single female was killed on St. George Island during the season, except by the three men above mentioned. Occasionally a female was included in the drive, but it was quickly detected by the natives and released.

Most of the seals killed were taken from North rookery and Zapadni. No drives were made from Staraya Artel. Only occasional drives were made from East rookery. All the animals were killed on the ground below the village.

METHODS OF DRIVING.

The method of driving was to gather up the pods of bachelors from the different hauling grounds and drive them back from the rookeries, dividing them into pods of 150 to 250, and bringing them thus into the village. As the pods were being formed and driven in, the small and large seals unsuited for killing were worked out and released. Each man knocked down his own allowance of seals and skinned them afterwards. Sixty was considered the usual day's work for a man. Practically all the seals driven up were killed. Not more than one seal in ten was rejected. The rule of the companies was that skins too small, too large, or cut would not be accepted or paid for. The sealers were therefore very careful in the work. A day's killing averaged from 800 to 1,800. There were about thirty available men among the natives.

Of the conditions on St. Paul I heard only indirectly through the representatives of Williams & Haven, who in their work were evidently directed by instructions from the head station on St. Paul, where the same methods were probably employed. The Williams & Haven and Hutchinson, Kohl & Co.'s interests were supreme on St. Paul Island, and they divided the rookeries between them.

To the best of my recollection 115,000 were taken on St. George and 250,000 on St. Paul during the season. Prior to this season it was understood that for several years no seals had been killed. In 1869 no skins were taken, except a few from seals killed for food for the natives. The privilege of taking these skins was given to Hutchinson, Kohl & Co., who, owning the principal salt houses and stores on the islands, were allowed to visit them to care for their property. Parrott & Co. sent a schooner to St. George to take off the skins which had been left over, but they took no new skins.

RUSSIAN METHODS.

The testimony of Mr. Howes, corroborating the evidence of Professor Dall, is valuable for a double purpose. It gives us an idea of the final methods of handling the seals which the Russians had evolved. It is evident that in these operations of 1868 the natives were carrying out rules and methods which had become traditional with them. One of these rules, as we learn from instructions to the officer in charge of the islands in the year 1853, was the strict protection of females.*

THE KILLING NOT INDISCRIMINATE.

We are also justified in assuming that the killing as practiced in 1868 did not in any way injure the herd, being confined as heretofore to the killing of the bachelors. That so large a number were killed is in part accounted for by reduction in killing in the years immediately prior to the transfer of the islands to the United States. A surplus of the larger animals thus saved remained to be gathered in. It is further evident that the killing extended down to the younger seals, doubtless including all or most of the two-year olds. This latter fact is given support by the absence of any regular killing for the year 1869 and the small quota of 23,000 only which was taken in 1870. We are not aware that the usual number of seals could not have been obtained in these years, but it may well have been that the quota for 1869 and 1870 had been anticipated to large extent in the year 1868. This much, however, remains certain, that the absence of large killings in 1869 and 1870 removed any possible injury which might have resulted to the herd from the too close killing of bachelors in 1868, and the fact that for fifteen years subsequent to 1870, 100,000 and more males were to be obtained on the hauling grounds of the islands shows conclusively that not only were the breeding females not disturbed in 1868, but furthermore that the supply of male life was not so reduced as in any way to affect the life of the herd.

AMERICAN MANAGEMENT.

In the spring of 1869 Dr. H. H. McIntyre, the representative of the United States Government, landed upon the island, establishing the authority of the Government, and taking the necessary steps for the protection of the rookeries.

The period of lawlessness which marked the season of 1868 was thus terminated in 1869 by Dr. McIntyre. He was appointed in 1868 and endeavored to reach his destination in the fall of that year, but on account of the lateness of the season he was forced to winter at Sitka.

THE ALASKA COMMERCIAL COMPANY.

In the meantime the Government had under consideration the most advantageous method of managing its fur seal industry. After a thorough consideration of all recommendations and suggestions bearing upon the matter, it was decided to lease the islands to a single reliable company under the immediate supervision and control of agents of the Treasury Department, duly commissioned for that purpose. In accordance with this decision in July, 1870, Congress passed an act authorizing this course of procedure, and immediately afterwards the Secretary of the Treasury advertised for bids for the lease of the seal fisheries for a period of twenty years.

Of the numerous offers received from various companies and associations, that of the Alaska Commercial Company, with a capital of $2,000,000, was accepted as the one most likely to promote the "interests of the Government, the native inhabitants, the parties heretofore engaged in the trade, and the protection of the seal fisheries."

---

*Appendix to Case of U. S., Fur Seal Arb., Letter No. 23, p. 82.

THE FIRST LEASE.

Under the terms of this lease the company were given the right to take 100,000 male seals over one year of age during the months of June, July, September, and October of each year. In 1874, by act of Congress, the number of seals to be taken and the time of sealing was made subject to the control of officers of the Treasury Department, and killing after August 1 was limited to the necessities of the food supply of the natives. The use of firearms or of other methods of killing, tending to drive the seals away, was prohibited, as was also the killing of the animals in the water.

In consideration for the skins so taken the lessees agreed to pay to the Treasury of the United States an annual rental of $55,000 for the islands, and a revenue tax of $2.62½ on each skin taken and shipped by them. In addition they were to furnish free of charge to the inhabitants of the islands each year 25,000 dried salmon, 60 cords of firewood, and a sufficient quantity of salt and preserved meats. The company was also to maintain a school on each island for at least eight months of the year, and were forbidden to sell any distilled spirits or spirituous liquors.

THE NORTH AMERICAN COMMERCIAL COMPANY.

Under the provisions of this lease the affairs of the islands were conducted until the close of the season of 1889, when it expired. The Treasury Department again advertised for bids and again leased the islands for a term of twenty years to a new company, the North American Commercial Company, their offer having been accepted as most advantageous to the Government.

THE PRESENT LEASE.

The new lease differs from the old to the advantage of the Government in the following points: The rental of the islands is fixed at $60,000. The tax of each skin is $9.62½. Eighty tons of coal are furnished the natives. The quantity of salmon, salt, and other provisions to be furnished can be fixed by the Secretary of the Treasury. The company furnishes free dwellings, churches, physicians, medicines, employment to the natives, and cares for the aged, the widows, and the orphans. The quota was fixed at 60,000 for the first year, and has since been subject to the regulation of the Secretary of the Treasury.

THE DECLINE IN THE BACHELOR HERD.

During the closing years of the lease of the Alaska Commercial Company a marked decrease in the fur-seal herd had begun to be noted. In the opening year of the new company's lease the depleted condition of the herd became apparent in the reduction to one-fifth in the original quota of 100,000 skins. Various factors entered into this decline, which it is not necessary here to discuss fully. These, as well as the original cause of decrease in the herd, were at best but imperfectly understood at the time.

LAND AND SEA KILLING.

To make the matter clear in the briefest possible space, at this point it is necessary to review somewhat the history of the herd. Conjointly with the killing on land, as practiced by the Russians and Americans, there had been going on from time immemorial killing of another sort now known as pelagic sealing. This was carried on at first by the Indians off the Northwest Coast, going out in their canoes to capture the seals in the course of their winter migration. The number of animals so taken was at first merely nominal, and it was not until about the year 1879, when schooners were first introduced to transport the canoes to their field of operations and care for them there, that the industry began to make itself felt on the herd. The rise of pelagic sealing thereafter was rapid, and in 1880 it was extended into Bering Sea. From this time on the killing at sea steadily increased, and as the bulk of the catch was composed of females the operations of pelagic sealing necessarily produced an injurious effect on the herd, which disclosed itself first in the diminished product of the hauling grounds already noted.

THE EXTENSION OF SEALING TO BERING SEA

At the first entry of sealing vessels into Bering Sea the United States acted on the precedent established by Russia in the Ukase of 1821, seized a number of the sealing vessels and confiscated them. Pelagic sealing being largely a Canadian industry, this action at once started a controversy with Great Britain which extended over the period from 1886 to 1890. Meantime the injurious effect of the slaughter of large numbers of females was more and more evident in the herd, until in 1890 it became alarming, the number of killable seals having decreased to one-fifth the usual number.

From the discussion of the seizures of Canadian vessels and the efforts of the United States to secure protection to its fur-seal herd, resulted a treaty, in the spring of 1892, remanding the whole matter to the consideration of a tribunal of arbitration which should pass upon the legal questions involved, and if need be provide such measures as were necessary for the proper protection and preservation of the herd. As a basis for such action, provision was made for a thorough investigation of the condition of the herd by a joint commission of experts.

THE TRIBUNAL OF ARBITRATION.

This Tribunal of Arbitration met at Paris in the summer of 1893, and as a result of its labors a set of regulations was formulated, the essential features of which were the establishment of a closed zone of 60 miles in Bering Sea about the islands and a closed season, from May 1 to August 1, within which all sealing was prohibited.

THE REGULATIONS.

During the pendency of the deliberations of the Tribunal, pelagic sealing was in part suspended. The season of 1894 witnessed the first operations of the regulations, and the resumption of pelagic sealing under them showed an increased catch over the unrestricted killing of 1891. The United States became convinced at the close of the first season that the regulations were inadequate. A protest was entered and Great Britain was asked to consider their immediate revision. At the close of each subsequent season this protest and request were again renewed. Failing to obtain such reconsideration the United States early in 1896 accepted the proposal of Great Britain to prepare for a reexamination of the regulations at the end of the five-year trial period, by subjecting the whole question to independent scientific investigation on the part of the two Governments. The present report is the outcome of this investigation so far as the United States is concerned.

CHAPTER III.

THE HOME OF THE FUR SEALS.

A. THE PRIBILOF ISLANDS.

THEIR GEOGRAPHY.

The little group of rocky islets known as the Pribilof Islands, from the name of their discoverer, is situated in the Bering Sea, in latitude 57° north and longitude 170° west. They are isolated from other land, the nearest point to the south being Unalaska Island, at a distance of 214 miles. Cape Newenham, on the mainland of Alaska, at a distance of 309 miles, is the nearest point to the eastward, while St. Matthew Island, 220 miles away, is the first land to the northward.

The islands are of volcanic origin, and are five in number—St. Paul, St. George, Otter, Walrus, and Sivutch Rock. The first two only are of importance. The last three are small islets lying about St. Paul Island and within about 7 miles of its shores. The main islands are separated by about 40 statute miles of water.

ST. PAUL ISLAND.

St. Paul, the largest island, lies in latitude 57° 07′ north and longitude 170° 17′ west.* It has an extreme length from northeast to southwest of 13½ miles. Its maximum width is 7⅔ miles. It has a shore line of about 45½ miles and an area of 43 square miles. The surface of the island is in the main low. Rocky plateaus alternate with low valleys, some of which contain ponds of fresh water. One of these covers a space upward of 2 miles in length by half a mile in width, but is very shallow. It is shut in by sand dunes, and lies along the narrow neck which joins the rocky headland called Northeast Point with the main body of the island. In the southeast end of the island is a salt-water lagoon, covering some 169 acres in extent, and connected with the sea by a narrow channel some 75 to 100 feet in width. The average elevation of the upland areas is not more than 150 feet, but a number of cinder cones and volcanic craters rise to varying heights in the interior portion of the island. Bogoslof attains an elevation of 590 feet, but Rush Hill on the west shore is the highest, 665 feet. A number of shallow bays indent the coast line, bordered by long stretches of sandy beach, behind which are areas of shifting sand dunes; but for the most part the shores are bowlder-strewn and rugged, rising in sheer cliffs at the headlands.

ST. GEORGE ISLAND.

St. George lies to the southeast of St. Paul at a distance of about 40 miles, in latitude 56° 36′ north and longitude 169° 32′ west.* It has a total length of 12 miles and a width of 4½ miles. The area is about 35.9 square miles, and it has a coast line of 30 miles. The central portion of the island is composed of an elevated ridge containing one peak over 900 feet in height. The general altitude of the island is about three times as great as that of St. Paul. The coast line is for the most part a succession of steep, rocky cliffs, breaking at intervals into short stretches of rocky slope. High Bluff, on the north shore, with an elevation of over 1,000 feet being the highest. The perpendicular cliffs and crevices among the bowlders in the upland portions of the island are the homes of innumerable sea birds. There are practically no sand beaches on the island, and the shore space available for rookery purposes is limited. By blasting off the cliffs it might, however, be greatly extended.

---

*Latitude and longitude of the village.

OTTER ISLAND.

Otter Island is situated on the south of St. Paul Island and about 6 miles distant from it. It is said to be the only island of the group which shows evidence of recent volcanic action. Its area is very small, being less than 115 acres in extent. Its shores are for the most part inaccessible. At the western end a cinder cone rises in a grassy slope to the height of 300 feet and drops off in a sheer cliff on the seaward side. At the eastern end is the pit of a crater, connected by a subterranean passageway with the shore. On the northern face the surface of the island slopes down into a low, rocky beach of limited extent, the only one on the island.

WALRUS ISLAND.

Walrus Island lies about 7 miles to the east of St. Paul. It is a narrow ledge of lava rock about half a mile in length. It reaches no degree of elevation, and in stormy weather the breakers wash over it. It is the home of countless numbers of sea birds and was formerly frequented by walruses. Sea lions occasionally land there.

SIVUTCH ROCK.

Sivutch Rock is a little crescent shaped rocky islet about a third of a mile off the southern shore of St. Paul. Its area is insignificant, but the island attains some degree of importance through the presence of a small fur-seal rookery, which fills its available space.

NO GOOD HARBORS.

There are no harbors of any kind about the islands of the Pribilof group. The bays are small and very shallow. In calm weather, however, there is anchorage for small vessels at various points. In stormy weather it is impossible to load or unload vessels of any kind with safety. Dangerous reefs are found about both islands, and navigation in their vicinity is subject to many risks.

THE CLIMATE.

The climate of the Pribilof Islands in summer is damp and chilly. Dense fogs almost constantly envelop them, rain falls frequently, and the sun is seldom seen. The summer temperature ranges between 40° and 50° F., reaching its highest point in August. During June, July, and August but few clear days occur. In September the cold winds which come on [illegible] the moisture from the atmosphere and bright days become more numerous. On such days the islands are extremely picturesque. Toward the end of October the [illegible] more [illegible], and in November winter begins, the change of season being [illegible].

During the winter much snow falls, but it is swept away by the high winds which prevail throughout the season. The winter temperature ranges from 22° to 26° F. The waters about the islands do not freeze, but toward the end of the winter the drift ice from the north floats down and incloses the islands, piling high upon the beaches and in the bays under the action of the surf. It remains packed about the islands until about the 1st of May, when it gradually disappears under the approaching change of season.

VEGETATION.

The surface of the elevated portions of both islands is in summer clothed with moss and grasses, in which are surprising numbers of showy wild flowers. Conspicuous among them are the Iceland poppy, monkshood, species of lupine, betony, chrysanthemum, senecio, saxifrage, harebell, and many others. The lower parts of the islands are covered with a soil of black lava sand, in which flourishes a coarse, rank, useless grass—the wild rye grass (*Elymus mollis*). Mingled with it is the coarse *putchki*, a species of *Archangelica*, used by the Aleuts as a spice. The abandoned hauling grounds of the fur seals are rapidly invaded by two species of slender, light-green grasses, *Glyceria angustata* and *Deschampsia cæspitosa*, known as "seal grass." These contrast sharply with the coarse, dark-green rye grass and a luxuriant species of wormwood, neither of which grow on land where seals have regularly hauled. About the rookeries themselves the movements of the animals virtually destroy all vegetation. There are no trees or shrubs. A small, dwarfish willow and a species of crowberry are the only approach to them that are to be found.

THE MAMMALS.

The principal mammals of the Pribilof Islands are the fur seals, which have their breeding grounds on the rocky beaches of St. Paul and St. George islands. At certain points on the islands are sea lion rookeries, and numbers of the animals are at all times to be seen lying about among the fur seals. A smaller number of hair-seals also frequent points about St. Paul Island. Formerly sea otters and walruses were not uncommon, but they are now practically extinct. The blue fox is common to both islands, and mingled with the blue foxes are a limited number of white ones. Lemmings are found on St. George and shrews on both islands.

THE BIRDS.

Myriads of sea birds breed on the rocky cliffs of St. George Island. Among these are the cormorants, murres, and chutchkis, sea parrots and gulls. Walrus Island is literally covered with these birds in the nesting season. Their eggs are gathered by the natives in boat loads in the spring. About the little ponds in the interior of the islands sandpipers abound. Phalaropes are numerous in the summer. Teal and mallard ducks are found in the fall. Geese in limited numbers alight on St. Paul to feed on the berries near north shore. White owls have been found on both islands.

INHABITANTS.

At the time of the discovery of the Pribilof Islands, in 1786, they were uninhabited. In order to obtain laborers to handle the seals, natives were brought over from the Aleutian Islands, and the first colony was established on St. George Island, near Staraya Artel rookery, so called from this fact, the name meaning "old guild" or association. Other villages were afterwards established on this island at Zapadni and at Garden Cove.

In the course of time men were carried in similar manner to St. Paul Island, the Aleutian settlements at Unalaska and Atka being chiefly drawn upon. The first settlement on St. Paul was established at the foot of the large shallow Mishalke Lake at the northern end of the island. Later settlements were located at Polovina and at Zapadni of St. Paul.

CONDITIONS IN RUSSIAN DAYS.

When, in 1799, the Russian-American Company came into control of the islands, the various settlements on St. Paul were grouped into one at Polovina. Afterwards they were transferred to the present location of the village, in order to be near the most advantageous landing places. In like manner, the villages at Garden Cove, Zapadni, and Staraya Artel were gradually broken up and the inhabitants grouped on the present site of the village of St. George, on the northern face of the island.

Of the condition of the Aleuts in these early days of Russian control Mr. Elliott says:

> They were mere slaves, without the slightest redress from any insolence or injuries which their masters might see fit in petulance or brutal orgies to inflict upon them. Here they lived and died, unnoticed and uncared for, in large barracoons, half underground and dirt roofed, cold and filthy.

This is probably not an extreme picture of the condition of the natives in Russian times. The Aleuts at the present time look back to these as their halcyon days; but this feeling may exist as the memory of indulgences which they are forbidden now. It is certain that but little thought or care was bestowed upon them by their Russian managers beyond seeing that they did the required work.

CONDITIONS UNDER AMERICAN CONTROL.

Under American control matters changed. The Alaska Commercial Company early in the period of its lease erected suitable frame cottages, furnished with the substantial comforts of life, which took the place of the cheerless and insanitary sod houses, or barrabaras. A physician with the necessary medical supplies was stationed on each island to care for the wants of the people. Churches were erected and presided over by priests of the Russian-Greek faith. Schools in which the English branches are taught were established. Wood and coal took the place of the filthy seal-blubber and driftwood fuel. The former exclusive diet of seal meat was supplemented by many of the staples and even luxuries of civilized living.

THE HANDLING OF THE SEALS.

All the work of driving, slaughtering, and skinning the seals, as well as the curing of the skins, is done by the Aleuts under the direction of the agents of the lessees. They are paid by the lessees for this labor at so much per skin. Under the old lease this was 40 cents, and for the 100,000 skins regularly taken this gave a fund of $40,000 for the support of a total population of between 400 and 450, of both sexes and all ages. At the present time the price is 50 cents a skin, but the number of skins taken has greatly decreased.

The earnings of the natives are treated as a community fund, which is distributed to the workers in several classes, according to their skill or experience. The amount due to each family is credited to them on the books of the lessees and is drawn upon by them through the island store as it is needed.

THE SUPPORT OF THE ALEUTS.

When, in 1890, the quota of seal skins fell to about one-fifth its former number, and when it was still further reduced under the modus vivendi of 1891–1893, the income of the Aleuts became so greatly reduced as to be inadequate to meet their wants. To cover the deficiency the Government has each year since that time appropriated an additional sum of money for their support. The liberal, not to say prodigal, character of this allowance can be judged by the fact that for the season of 1896 these people exhausted, in addition to their earnings, of about $16,000, from the taking of seal and fox skins, the full Congressional appropriation of $19,500. They pay nothing for rent, taxes, or for medical attendance, and during the greater part of the year their meat is free. There are few laboring communities whose people can boast of such generous conditions of support.

The original colony of Aleuts transported to the islands numbered, according to Mr. Elliott, 137 souls. To these additions were made from time to time. In 1871 Captain Bryant tells us that the population of the two islands numbered 426 persons, of both sexes and all ages. No new accessions have been made lately, and the population has dwindled to slightly less than 300 at the present time.

The Aleuts are a gentle and tractable class of people. They are courteous in their manners and unusually skillful in their work. They have the usual aboriginal weaknesses for rum and the vices of civilization, but as a result of the isolated position of the islands, and the strict control which the Government is able, through its officers, to exercise over them, the people of St. Paul and St. George are a respectable and orderly class.

THE GOVERNMENT AGENTS.

The interests of the Government on the islands are in charge of agents of the Treasury Department, who supervise the work of the natives, look after their wants, and enforce the authority of the Government. The natives are allowed, in large measure, nominally to govern themselves. They have a head chief and second chief, who deal directly with the people, and are in turn dealt with by the Government agents. The relations of the people with one another are controlled by a council of the wise men, chosen, like the chiefs, by the people themselves.

On the whole, the lot of the Aleut on the Pribilof Islands is an unusually favored one. He works but a few months in the summer and is liberally fed and clothed by the Government. If the seal herd is again restored to its former capacity, he may in time even become wealthy. The chief social drawback in his relations lies in the want of consecutive work. The lack of anything to do through the long winter induces laziness and gambling. Even useless work if continuous would be a real boon to the Aleut.

B. THE FUR-SEAL ROOKERIES.

THE BREEDING GROUNDS.

Wherever there is a rocky beach of some breadth or a sloping rocky hill on the Pribilof Islands the fur seals have located their breeding grounds, or "rookeries," as they are called. The best type of rookery ground is a moderate slope covered with coarse rocks and descending to a beach of shingle or rounded bowlders. On these beaches their gregarious habits cause the animals to crowd together in close-set masses. The limits of the rookeries are defined by abrupt cliffs or headlands, which cut off the beaches, by inaccessible cliffs that rise in the rear and by intervening sand beaches. They seldom extend far back from the sea under any condition, as access to the water is an essential feature.

THE HAULING GROUNDS.

Adjoining the breeding grounds and an essential part of each rookery are what are known as the "hauling grounds" of the bachelors, frequented by the young males of the ages of 5 years and under, these classes being strictly excluded from the breeding grounds. These hauling grounds are usually located on sandy beaches bordering the breeding grounds or on the flat "parade" grounds above and in the rear of the harems. In most cases the bachelors are forced to encircle the end of the breeding grounds to reach their locations in the rear, but in some cases neutral strips or runways are left among the harems through which the bachelors haul out unmolested. Not infrequently the bachelors seek to use runways which are not recognized as neutral, and they are summarily thrown out by the harem masters. This leads to confusion and fighting among the bulls, and the consequent destruction of females and young pups. In many cases the hauling grounds are at a considerable distance from the breeding grounds, but even where they are located immediately in the rear of the harems, a buffer of idle or reserve bulls keeps them at a safe distance. The young males have a wholesome and well-defined fear of the bulls, which experience amply justifies.

In the present depleted condition of the fur-seal herd much ground once occupied has been abandoned. The tendency of the animals, in obedience to their gregarious instincts, is to crowd together, and as their numbers decrease the rookeries shrink up. With the restoration of the herd these abandoned grounds will undoubtedly be reoccupied. It is probable that the occupation of absolutely new ground could only result from an overcrowded condition of the rookeries. Not all the available space on the islands was ever occupied even in the time of greatest expansion, as there are long stretches of suitable beach line on which seals have never been known to breed.

THE ST. PAUL ROOKERIES.

The following is a brief description of the breeding rookeries of St. Paul Island, beginning at Northwest Point:

*1. Vostochni** (*eastern*).—This rookery lies on the northern face of the peninsula of Northeast Point. It extends from the vicinity of Cross Hill, at the termination of the great sand beach known as "North Shore," to the tip of the point itself. It occupies for the most part beaches of coarse bowlders, with occasional outcroppings of harems on the flat ground above. The line of harems is frequently broken by short stretches of sand beach, which are used by the bachelors as runways to reach their hauling grounds. On the seaward slope of Hutchinson Hill, which forms the highest part of the peninsula, the rookery becomes greatly widened and closely massed. Late in the season harems were even found at the summit of the hill.

---

* The different fur-seal rookeries have for the most part retained their picturesque Russian names. It is very desirable that they should continue to do so, and it would be appropriate if Russian equivalents were substituted for the few English names which have come into use. In the spelling of the Russian names we have followed the present accepted methods of transliteration under the advice of

From this point to the end of the rookery the harems scatter along the bowlder beach in a narrow band. About midway to the end is a small sea-lion rookery. At the eastern angle of Hutchinson Hill and on the sand beach behind Cross Hill are the most important hauling grounds of the rookery, though at the present time, owing to the numerous breaks in the lines of breeding seals, small pods of bachelors are to be found at a large number of other places.

2. Morjovi (*of the walrus*).—The line of division between this and the preceding rookery is a purely arbitrary one. At the point there is a considerable break in the line of harems and behind is a small hauling ground. The harems resume and follow along the bowlder beach as before for a short distance. Then a break occurs, with a runway for the bachelors and another sea-lion rookery. Beyond this is the principal portion of the rookery. It consists of a large body of harems closely massed and lying back on the flat at the angle of the sand beach at Walrus Bight. Behind and to the west of this mass is the great hauling ground of Morjovi rookery. Beyond the sand beach scattering groups of harems occur on the sides of a long, narrow, tongue of land jutting out to the eastward, called Sea Lion Neck. Another sand beach intervenes, and the rookery ends in a considerable mass of harems grouped about a rocky point nearly opposite Webster Lake, on the eastern side of the peninsula. An unimportant hauling ground lies at the extreme end of the rookery.

Vostochni and Morjovi combined furnish the greatest continuous fur-seal rookery on the two islands. Along their 3 miles of coast line are upward of 100,000 fur seals of all classes, about one-fourth of the total number on the Pribilof Islands. From the summit of Hutchinson Hill a bird's-eye view of the two rookeries can be had, and the sight is a most impressive one. A greater number of fur seals (or for that matter any other animals) is to be seen here than for any other point in the world.

3. Polovina (*halfway*).—This rookery, as its name indicates, is located halfway between Northeast Point and the village. The main part of the rookery lies massed upon the beach and the flat above the cliffs that rise from the low reef of Polovina Point and shade down with a gentle slope to the great sand beach which stretches away 2 miles or more to Stony Point. At the angle of the sand beach the bachelors make their way to the hauling ground in the rear of the massed portion of the rookery.

---

a competent Russian scholar, Mr. Alexis V. Babine, librarian of the University of Indiana. Much confusion in the records has arisen through the current use of a Russian and English name for the same place, as for example, Zapadni and Southwest Bay, Polovina and Halfway Point. We have in each case tried to select the most suitable name for the purpose, and it is to be hoped that in the future agents and others concerned will conform to the usagè here adopted. We have given a separate name to each of the three parts of what has been generally known as Zapadni. The great rookery lying about the shores of Northeast Point has been divided for convenience at the tip of the point. It has been thought best, because of the importance it has obtained through the frequent observations made upon it during this investigation, to designate as Ardignen rookery, a small detached breeding area on Reef peninsula.

Above Polovina Point extend steep cliffs with a narrow beach of shingle, along which harems are scattered in detached groups. Occasional breaks or runways in the cliff wall give access to the flat ground above, and at one or two points the harems overflow on the level. At the last break in the cliff is a large hauling ground. The cliff then closes in, and for a half mile leaves no room for the seals to lie. Again, as at the southern end, the cliff shades off in a gradual slope to the sand beach, which continues to the northward as far as Northeast Point. On this northern rocky slope of the cliff is situated the small but picturesque rookery of Little Polovina, in reality an overflow of the greater rookery. The Polovina rookeries have a population of about 20,000 seals of all classes.

4. *Lukanin* (*name of an early seal hunter*).—From Stony Point to the southward is the great sand beach of Lukanin. At its end rises the rocky slope of Lukanin Hill, along which the rookery of the same name lies. At the northern end is the hauling ground of the rookery. It is a favorite resort for the very young bachelors, a greater proportion being found here than on any other rookery. Part of the breeding ground lies at the foot of cliffs, which are easy of approach, and as the rookery is near to the village it has been made the subject of close study by numerous observers.

5. *Kitovi* (*of the whale*).—This rookery is merely a continuation of Lukanin, from which it is separated by the purely arbitrary boundary of Lukanin Point. The rookery lies along bold rocks, basaltic columns, and slopes of cinder and lava. It is an ideal rookery ground, as the slight mortality of pups indicates, only about 109 dead pups being found in 1896 in a total of 6,049. The hauling ground of this rookery is unimportant, probably because the bachelors haul out with those from Lukanin. The few which haul out at Kitovi proper are found at the southern end of the rookery, back of Kitovi Bay. Kitovi and Lukanin are in reality one great rookery. They represent a total population of about 25,000 seals.

6. *Reef* (*Russian, rifovoye*).—At the southern end of St. Paul Island another long narrow neck of land juts out, known as Reef peninsula. On the southern shore of this peninsula is the great breeding ground known as Reef rookery. The harems lie along the irregular beach for a distance of nearly a mile. In the central portion the seals extend back in long, wedge-shaped masses for a considerable distance over the gentle slope strewn with large bowlders.

In the rear of the central portion of this rookery is the great hauling ground, which lies in a hollow between two rocky ridges. Connecting this hauling ground with the sea are four runways, which divide the rookery into five large masses. In two of these runways occur ponds of water, which fill by the surf in the winter and become indescribably foul in summer, as the bachelors wallow through them.

Reef rookery is one of the largest on the islands. It is separated from its fellow (Gorbatch) on the other side of the peninsula by a broad flat upland, known as the "parade ground." This parade ground occupies the highest part of the peninsula. It extends back from the perpendicular cliffs at the westward end in a long easy slope to the eastward, where it falls to the water's edge at the beginning of the rookery.

This space was a favorite playground for the bachelors of the two rookeries in the palmy days, and the wandering bands of seals kept its surface bare. A few bachelors still haul across it, but for the most part it is to-day overgrown with grass and weeds.

7. *Sivutch* (*sea lion*) *Rock*.—About a third of a mile off shore from Reef rookery is a small crescent-shaped rocky islet. Its southern side is an abrupt cliff, but to the

north it slopes back gradually to the water. This northern slope and such other points on its surface as are accessible, are occupied by a small rookery of three or four thousand seals. At either end of the islet is a hauling ground. On the southernmost one the returning bachelors are said to haul out first in the spring.

Six miles farther off to the south lies the larger islet called Otter Island. This is not a rookery proper, but contains a hauling ground, and is resorted to by bachelors, probably from the rookeries of Reef peninsula. A few seals still haul there, and during the season of 1896 a single harem of five cows with their pups was found among them. This is the first record of breeding seals having occupied Otter Island. No trace of the harem was found during the season of 1897. The hauling ground, which lies on the northern face of the island, is one of considerable extent, and in former times a large number of seals evidently occupied it. About 200 were found there at the time of our visit in 1896, and upward of a thousand in 1897.

8. Ardiguen (*pile of stones*).—On the western edge of Reef peninsula, and just north of the ultimate point, is an isolated concave rocky slope and beach overlooked by high parapet-like cliffs, above the general level of Reef rookery, to the surface of which the breeding ground ascends at one point in a "slide." The rocky beach, the slide, and, in 1896, a part of the flat above were filled with harems. Other harems extended along the narrow beach at the foot of the cliff, which everywhere rises sheer from the western end of the peninsula. The wall-like rocks above the slide portion of the rookery make it possible to watch the seals at close range without disturbing them. It is the best point on the island for the observation of rookery life. Almost daily observations, a record of which will be found in the Daily Journal (Part II), were made upon it during the summer of 1896, and on this account it has been given a separate name. It has heretofore been included in Reef rookery.

9. Gorbatch (*the hump*).—This picturesque rookery lies on the north shore of Reef peninsula and faces Zoltoi Bay. The steep cliffs on the western end, at Gorbatch Point, break down in a long cinder slope, which rises rather steeply from the shingle beach to the parade ground above. Along the bowlder beach and the foot of the slope the harems lie close together, extending back at one or two points in wedge-shaped masses. On the flat rocks at the point marking the beginning of the bay is a favorite sleeping place for a few sea lions, and near by is an isolated rock on which a small group of hair seals are usually to be seen hauled out.

To the northward the cinder slope shades into a slope of smooth rock, and this is succeeded in turn by a slope covered with great irregular bowlders. At the end of this an abrupt cliff begins, and the rookery terminates in a long belt of harems on the narrow beach at its foot. At the angle, where the cliff breaks down suddenly into the sand beach of the bay, is the famous hauling ground known as Zoltoi, (golden) (more correctly spelled Zolotoi), from its yellowish lava sands. This is the only hauling ground for Gorbatch rookery, and in the days when the shores of the Reef rookery were packed with harems it was practically the only hauling ground for the two rookeries. Across the neck of the peninsula, which is here very narrow, is a small cove-like beach frequented by bachelors, probably from the Reef rookery.

The nearness of Zoltoi to the village (about one-fourth of a mile away) has brought its herds under constant inspection. The earliest and latest drives are always made from this point.

Reef and Gorbatch rookeries are in reality one great breeding ground. They represent a total population, including Ardiguen and Sivutch Rock, of about 70,000 seals.

10. Spilki (*the points*).—This is the abandoned rookery space, which formerly occupied the slope and beach of the hill back of the village of St. Paul. The ground was occupied until about ten years ago as a rookery, when it was gradually abandoned.

11. Lagoon.—This rookery is separated from the site of Spilki by a short stretch of sand beach and the narrow channel connecting the salt lagoon with the village cove. It is situated on a long reef of coarse bowlders, which has been gradually pushed up by the ice until it has almost completely shut off the lagoon from the sea. The rookery is a small one, having a population of only about 6,000 seals. There is a small hauling ground on the rear or lagoon side of the reef, but no drives are made from it.

12. Tolstoi (*thick*).—From the angle of the reef on which Lagoon rookery is located the cliffs rise abruptly, leaving but little beach. At the bold point of Tolstoi Mys or headland the rookery of this name begins, extending along the southern curve of English Bay to the great sand beach at its foot. For a considerable distance the harems lie on the narrow beach at the foot of steep cliffs. About the middle of the rookery the cliffs break down in a long concave slope strewn with angular bowlders. Back of this are sand dunes, and the wash from them has produced at the foot of the slope a broad sand flat just above the bowlder beach.

This sand tract of Tolstoi has a denser population than is to be found on any other rookery ground on the island. In the height of the season the crowded area is the scene of constant fighting among the bulls because of the crowding of the harems. The breeding mass extends part way up the slope, and in the latter part of the season the seals move back from the sandy flat, leaving it bare.

At the back of the slope among the sand dunes is a hauling ground for the bachelors. To reach it they must encircle the end of the rookery. A more important hauling ground is situated on the sand of English Bay, just beyond the rookery. Halfway along the curve of the bay is another hauling ground, known as Middle Hill, which is removed from any rookery and is probably more or less common to all the breeding grounds about English Bay.

On the whole Tolstoi is the most interesting of the rookeries, and offers the greatest diversity of conditions of life. It is also famous for the great mortality among the young pups born there. The view of the rookery from the sand dunes to the eastward is exceedingly picturesque.

13. Zapadni (*westerly*).—This rookery, begins at the rocky cliffs of Zapadni headland and extends along the convex shore to the sand beach of Southwest Bay. It occupies the usual bowlder beach and extends back along the gradually sloping upland. The seals are in many places massed in shallow depressions and gullies which seam the rocky slope. In these places, as on the sand flat of Tolstoi, many pups are killed. At different places in the course of the rookery are runways through which the bachelors haul out to their grounds in the rear. The principal hauling ground, however, is at the angle of the rookery with the sand beach of Southwest Bay.

14. Little Zapadni.—The sand beach of Southwest Bay intervenes between this rookery and Zapadni proper. It occupies a similar but smaller convex beach and hillslope toward the east. The surface of this little rookery is rugged and broken in the extreme, making it an ideal breeding ground. At its eastern end is the single hauling ground, reached through the open space that lies between this and the narrow breeding ground which occupies the reef beyond.

15. Zapadni Reef.—This rookery lies on a reef of bowlders similar to that occupied by Lagoon rookery. The harems are grouped in scattered patches along the narrow, rocky beach. At the end of the reef is a large hauling ground which is also more or less common to the younger bachelors from the three Zapadni rookeries. Here the sand beach of English Bay begins, which stretches around to Tolstoi rookery.

These three breeding grounds were originally one, but the decrease of the herd has so separated them as to make it advisable to give them distinct names. Their combined herd is next in size to that of Reef Peninsula, having about 60,000 seals of all classes.

At a considerable distance above Zapadni headland is an isolated hauling ground for the older bachelors and half bulls, known as Southwest Point. A few still haul out there, and a hair-seal rookery is situated on an islet offshore. The place probably never contained a breeding rookery.

16. Marunichen (personal name).—This is an abandoned rookery ground on North Shore. It was never an important rookery, and has long been deserted. The oldest inhabitant of the village of St. Paul simply remembers hearing it spoken of when he was a boy. No cause was assigned for its abandonment. A herd of hair seals haul out in the neighborhood of this old rookery.

THE ST. GEORGE ROOKERIES.

The rookeries of St. George are five in number. They are smaller and less important than those of St. Paul, containing only about one-sixth of the total number of seals on the two islands. On account of the rugged character of the coast line of St. George its rookery space is limited and the conditions less varied. The harems lie chiefly along broken cliffs, on basaltic columns, and bowlder-strewn slopes. Four of the rookeries are grouped on the northern face of the island, while the fifth lies isolated on the southwestern corner. Beginning with this last rookery, the following is a brief account of the breeding grounds of St. George Island:

1. Zapadni (westerly).—This rookery lies along the rocky beach of Zapadni Bay, ascending the slope of the long hill where the harems are located on flat benches of rock. A part of the beach line lies at the foot of the cliff formed by the breaking off of the hill. In the rear of the lower or beach portion is the hauling ground of the rookery, reached by two breaks in the mass of breeding seals and extending inland some distance.

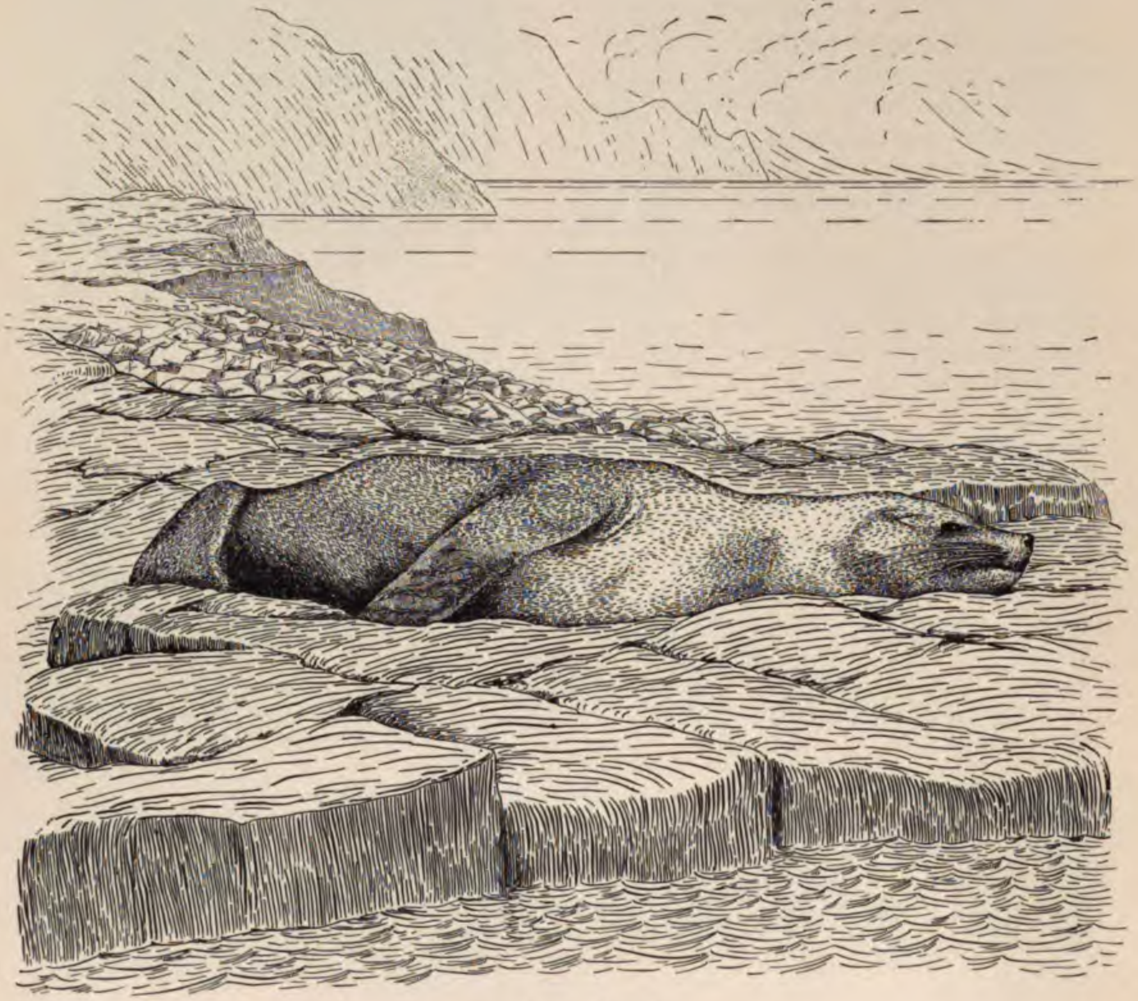
2. Staraya Artel (old guild).—This is a very picturesque rookery, lying in a narrow belt along the steep slope of a hill which breaks off in an abrupt cliff on the seaward side. The beach at the foot of the rookery is a limited one, and the lower harems are situated on shelf-like, rocky projections which gradually shade into the even surface of the hill slope, on which the harems are closely massed. The hauling ground of the rookery lies in the hollow formed by the inward sweep of the hill. In the hollow is a small pond, once a lagoon, which the reef-like beach has cut off. Over this beach the bachelors haul out and lie on the bank of the pond.

3. *North* (*Russian, severnoye*).—This is the largest of the rookeries of St. George. It is located about midway between Staraya Artel and the village of St. George. The rookery is the nearest one to the village, and therefore well adapted for observation. It lies throughout the greater part of its length on the narrow beach at the foot of perpendicular cliffs. Through occasional slides or breaks in the cliff wall the harems draw back to the hill slope behind. The bachelors have runways at both ends of the rookery and occupy the flat ground above and behind the cliffs.

4. *Little East.*—This is a rather small collection of harems located on the broken slope formed by the breaking down of the cliffs, which from the village landing eastward to this point rise perpendicularly. From this point the cliff curves inland in a gradual slope, to appear again beyond east rookery at the eastern angle of the island. The small hauling ground of the rookery is located at the eastern end. Little East rookery resembles Little Polovina rookery of St. Paul Island both in size and in its relation to the larger rookery of which it is a branch.

5. *East.*—From Little East rookery for a considerable distance to the eastward the beach is low, and behind it lies a level plain covered with seal grass, and evidently once hauled over by bachelors from both rookeries. East rookery begins in a long line of scattering harems occupying the rocky beach. At the angle where the cliffs resume, the harems are massed together on the slope and along the narrow bowlder beach until cut off by the breaking out of the cliff.

The hauling ground of East rookery is in the rear of the first beach portion, and is reached by several breaks in the line of harems. Along the beach portion of East rookery the sea lions also haul out and lie among the fur seals, and at the point is a small rookery located among the fur-seal harems. A larger and more important sea-lion rookery is located on the southern side of St. George Island toward Garden Cove.



YOUNG MALE SEA LION.

Drawn from nature by Bristow Adams.

CHAPTER IV.

THE FUR SEAL OR "SEA BEAR."

ITS RELATIVES.

The fur seals, with their associates, the walruses and sea lions, constituting the suborder Gressigrada* (Allen), are obviously related to the bears. The animals comprising this group, among other characters, have plantigrade feet, the anterior limbs modified as oars, and with rudimentary claws, if any. The posterior limbs bend forward at the knee and the long, webbed toes extend beyond the claws. Only the anterior limbs are used in swimming. The head and neck can be elevated as in the bear, and the external ear is moderately developed. The animal can run or lope along the ground as do ordinary mammals, and with considerable rapidity.

THE SEA BEAR AND TRUE SEAL.

Much misconception as to the nature and habits of the fur seals has arisen from their supposed resemblance to the animals in the North Atlantic and elsewhere, called "seals." The fur seal, however, has no close affinity with the suborder Pinnipedia, to which the true or earless seals belong. The various forms of true or hair seals constituting the group Pinnipedia have the feet not truly plantigrade, short, with long claws. Only the posterior limbs are used in swimming, and these are not susceptible of bending forward at the knee. The animal, therefore, can not walk or lope at all, and only wriggles while on land. Its neck is short and it can scarcely raise its head. It has no external ear.

The internal structures of the animals show equally marked differences. The hair seals, whatever their origin, must come from a different parent stock, and their relation to land carnivora is more remote. Beyond the fact that both fur seal and hair seal are carnivorous mammals, feeding on fish and adapted for life in the water, the two types have little in common. In both species the thick blubber under the skin goes with the life in cold water. The resemblances associated with aquatic habitat are only analogies and have no value in scientific classification. In structure, appearance, habits, disposition, and method of locomotion, they are entirely distinct, and their evolution as pelagic animals has been along separate lines.

THE FUR SEALS OF THE ANTARCTIC.

The fur seals of the world belong to two distinct groups or genera, closely related to the sea lions. One of these, the genus *Arctocephalus*, is widely distributed over the Antarctic oceans, where its members formerly existed in vast numbers along portions of the coasts of South America, South Africa, Australia, and New Zealand, as well

---

*Called *Remipedia* in our preliminary report, page 12, but the name *Gressigrada* is earlier and includes the same forms.

as many of the pelagic islands of the Antarctic regions.* Perhaps the most northern extent of this genus is the herd which formerly existed in considerable numbers on Guadalupe Island, and other islands in its vicinity, where a remnant probably still breed hidden in the caves and recesses of their shores.

THE FUR SEALS OF THE NORTH PACIFIC.

The fur seals of the North Pacific belong to the second group, the genus *Callorhinus.* It is resident upon certain barren and rocky islands in Bering Sea and the Sea of Okhotsk, unknown to aboriginal man, and, so far as we are aware, never visited by man before the discovery of the Komandorski Islands by Vitus Bering in 1741 and the Pribilof Islands by Gerassim Pribilof in 1786. In addition to the Komandorski and Pribilof islands, seals of the genus *Callorhinus* also occupy certain islands of the Kuril group, and also the rocky islet known as Robben Reef, off the coast of Saghalin.

STELLER'S ACCOUNT.

Our first knowledge of the fur seals of the North comes from the account of Georg Wilhelm Steller (1709–1745), a German naturalist, who accompanied Bering on the voyage which resulted in the discovery of the Komandorski Islands. During the winter which the survivors of the ill-fated *St. Peter* spent on Bering Island, Steller visited the south, or Poludinnoye rookery of this island and wrote an account† of the fur seals or "sea bears" as he called them.

On Steller's description of the "sea bear" (*Ursus marinus*) of Bering Island, Linnæus based his description of *Phoca ursina*, or the bear-like seal. From the Linnæan name the fur seal of the North Pacific came to be called *Callorhinus ursinus*, the type of the species being the Komandorski herd.

THE THREE HERDS.

The fur seals of the North Pacific comprise three distinct herds, which do not intermingle in any way, having distinct breeding grounds, feeding grounds, and routes of migration.

THE PRIBILOF HERD.

The most important of the three herds is that which resorts to the Pribilof Islands. These breed upon the islands of St. Paul and St. George during the summer, and in winter pass down through the channels of the Aleutian Islands into the Pacific Ocean, in their migrations reaching as far south as the coast of southern California and returning along the west coast of North America.

THE KOMANDORSKI HERD.

The next herd in importance is that resorting to the Komandorski Islands. These breed upon the islands of Bering and Medni, passing in winter down along the eastern coast of Japan and returning by the same route.

---

* A full account of the southern fur seals will be found in Part III of this report.

† A translation of Steller's account will be found in Part III of this report.

THE ROBBEN ISLAND HERD.

The third herd is resident in the Sea of Okhotsk on Robben Island, where a considerable remnant still exists, and formerly occupied other rookeries, now virtually extinct, on four islands of the Kuril group—Musir, Raikoke, Srednoi, and Broughton. The migration route of this herd lies in the inland sea of Japan.

THREE DISTINCT SPECIES.

The fact that the seals of the Pribilof herd differ from those of the Commander Islands in color, in form, and in character of the fur has long been recognized. These differences, though slight, are permanent and constant. As no intermediate forms are known, and as the life courses of the herds are wholly distinct, apparently no intermediate forms can exist. We may therefore hold that the herds represent distinct species. As the Komandorski seals formed the type of *Callorhinus ursinus*, the Pribilof seals may be taken to represent a new species, to which the name *Callorhinus alascanus* may be given, and the Robben Island herd, likewise different, may be called *Callorhinus curilensis*.

CALLORHINUS ALASCANUS.

The description of this new species or subspecies is given in full in a special paper which appears in Part III. It may be noted here that *alascanus* may be known by the stouter, broader head, by the thicker neck, by the prevalence of warm, brown shades in the coloration of the females and the young males, by the more silvery color of the gray pups, which have the whitish patches on the rump less than in *ursinus*. In general it shows a lack of sharp contrast between the coloration of the sides and belly. The fur is of superior quality and exhibits sufficient difference to make it possible for the dealers handling the skins to distinguish them by this means alone. In *alascanus* the claws on the foreflipper are undeveloped, being represented by pits in the skin.

CALLORHINUS URSINUS.

The true *ursinus* has a slenderer head and neck. The females and young males are sooty rather than brown, the light and dark shades being alike for the most part without ochraceous tints. The belly is usually rather sharply paler than the back, and the gray pup is more brownish and less gray than in the Pribilof animal, having a pale patch on each side of the rump. The fore feet have two or three rudimentary claws.

CALLORHINUS CURILENSIS.

The seal of Robben Island and the Kurils, differs from both of the foregoing in the whitish color of the under fur. This is rusty brown in *ursinus* and *alascanus*. It is said also to have a broader head than *ursinus* and to exhibit other differences in the quality of the fur, distinguishing the seals of Robben Island from either of the other herds.

In the following discussion our attention will be directed chiefly to a consideration of the Pribilof Islands seals. In Part IV of this report the herds of the Komandorski and Kuril islands will be discussed in detail.

THE NOMENCLATURE OF THE FUR SEAL.

The eccentricities of the nomenclature of the fur seals have frequently been noted. Attention is here called to the matter merely to avoid confusion. It is, for example, incongruous that a "cow" should occupy a place in a "harem" on a "rookery" and bear a "pup," which, if a male, should be known for the first four years of its life as a "bachelor" and afterwards as a "bull." Moreover, it is absurd that this animal, which is in reality more like a bear, should be called a "seal," thus confounding it with a distinctly different animal. But these names are all so closely identified with the animals and their history that it is useless to attempt to change them, and so we may expect the "sea bears" of the North Pacific to continue to produce "seal skins," which, though originally and properly taken only on land, will remain the product of a "fishery."

The Russian names "sikatch" (grown bull), "polosikatch" (half bull), "holostiak" (bachelor), "matka" (mother), and "kotik" (pup) are in common use among the Aleuts on the Pribilof and Komandorski islands. These words form their plurals in i, thus: sikatchi, holostiaki. The Aleut names "atagh" or "adakh" (bull), "ounatha" (cow), "lakutha" (pup) are now used mainly by the native children.

THE CATEGORIES OF SEALS.

THE MALE.

The male fur seal or bull reaches full maturity at the age of about 7 years. He is probably sexually mature at an earlier age, but does not possess the strength and courage necessary to win and hold a place on the breeding grounds. The weight of the adult bull is about 350 to 450 pounds. A typical animal measures about 6 feet in length, has a girth over the shoulders of about 4½ feet, and measures nearly 6 feet from tip to tip of the outstretched fore flippers. In color the adult males vary considerably, the general shade being blackish or dark brown, with longer hairs or bristles of yellowish white. These are especially long and numerous on the thickened back of the neck, forming the so-called "wig." The bulls are excessively fat on their landing in the spring, but grow gradually lean and thin during the season on land, never tasting food or leaving their posts during the breeding season. Early observers made use of the appropriate name of "beachmaster" for the bull, a name which deserves to be retained for its descriptive qualities.

THE FEMALE.

The female fur seal or cow is much smaller than the male. When fully grown she measures about 4 feet in length, has a girth of 2½ feet over the shoulders, and measures [illegible] from tip to tip of the outstretched fore flippers. The cow has a soft, smooth fur of varying shades of gray, the younger females being usually, though not always, silvery white underneath the throat. The cow bears her first offspring at the age of 3 years, but her full growth is not attained until a year or two later. Her average weight is about 80 pounds. The name "clapmatch," used by early writers to designate the female, is now obsolete.

THE BACHELOR.

The young male or bachelor is very similar to the female in color, size, and appearance until he [illegible] year. [illegible] this year his skin is at its best. In

THE NOMENCLATURE OF THE FUR SEAL.

The eccentricities of the nomenclature of the fur seals have frequently been noted. Attention is here called to the matter merely to avoid confusion. It is, for example, incongruous that a "cow" should occupy a place in a "harem" on a "rookery" and bear a "pup," which, if a male, should be known for the first four years of its life as a "bachelor" and afterwards as a "bull." Moreover, it is absurd that this animal, which is in reality more like a bear, should be called a "seal," thus confounding it with a distinctly different animal. But these names are all so closely identified with the animals and their history that it is useless to attempt to change them, and so we may expect the "sea bears" of the North Pacific to continue to produce "seal skins," which, though originally and properly taken only on land, will remain the product of a "fishery."

The Russian names "sikatch" (grown bull), "polosikatch" (half bull), "holostiak" (bachelor), "matka" (mother), and "kotik" (pup) are in common use among the Aleuts on the Pribilof and Komandorski islands. These words form their plurals in i, thus: sikatchi, holostiaki. The Aleut names "atagh" or "adakh" (bull), "ennatha" (cow), "lakutha" (pup) are now used mainly by the native children.

THE CATEGORIES OF SEALS.

THE MALE.

The male fur seal or bull reaches full maturity at the age of about 7 years. He is probably sexually mature at an earlier age, but does not possess the strength and courage necessary to win and hold a place on the breeding grounds. The weight of the adult bull is about 350 to 450 pounds. A typical animal measures about 6 feet in length, has a girth over the shoulders of about 4½ feet, and measures nearly 6 feet from tip to tip of the outstretched fore-flippers. In color the adult males vary considerably, the general shade being blackish or dark brown, with longer hairs or bristles of yellowish white. These are especially long and numerous on the thickened back of the neck, forming the so-called "wig." The bulls are excessively fat on their landing in the spring, but grow gradually lean and thin during the season on land, never tasting food or leaving their posts during the breeding season. Early observers made use of the appropriate name of "beachmaster" for the bull, a name which deserves to be retained for its descriptive qualities.

THE FEMALE.

The female fur seal or cow is much smaller than the male. When fully grown she measures about 4 feet in length, has a girth of 2½ feet over the shoulders, and measures 4 feet from tip to tip of the outstretched fore-flippers. The cow has a soft, smooth fur of varying shades of grey, the younger females being usually, though not always, silvery white underneath the throat. The cow bears her first offspring at the age of 3 years, but her full growth is not attained until a year or two later. Her average weight is about 70 pounds. The name "clap-match," used by early explorers to designate the female, is now obsolete.

THE BACHELOR.

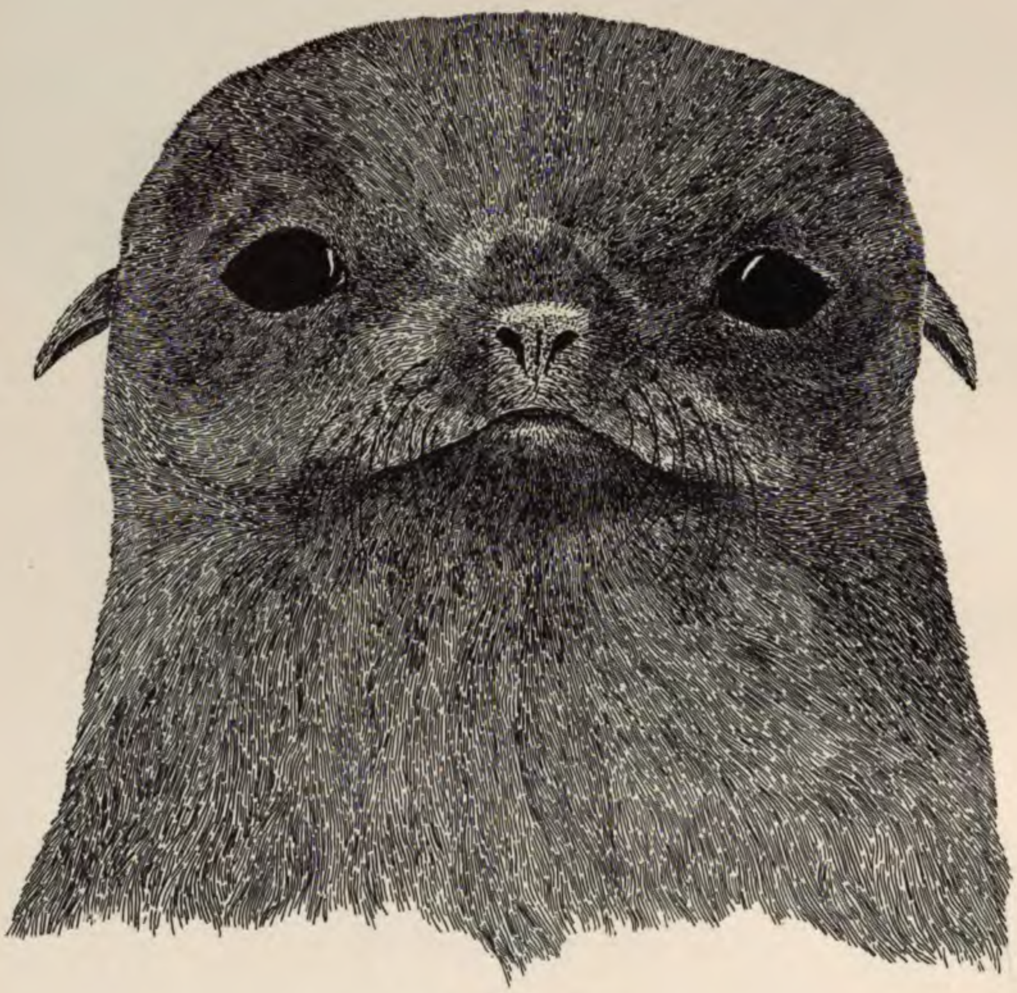
The young male or bachelor is very similar to the female in color, size, and appearance until the end of the third year. In this year his skin is at its best. In

FUR SEAL PUP.

Drawn from nature by Bristow Adams.

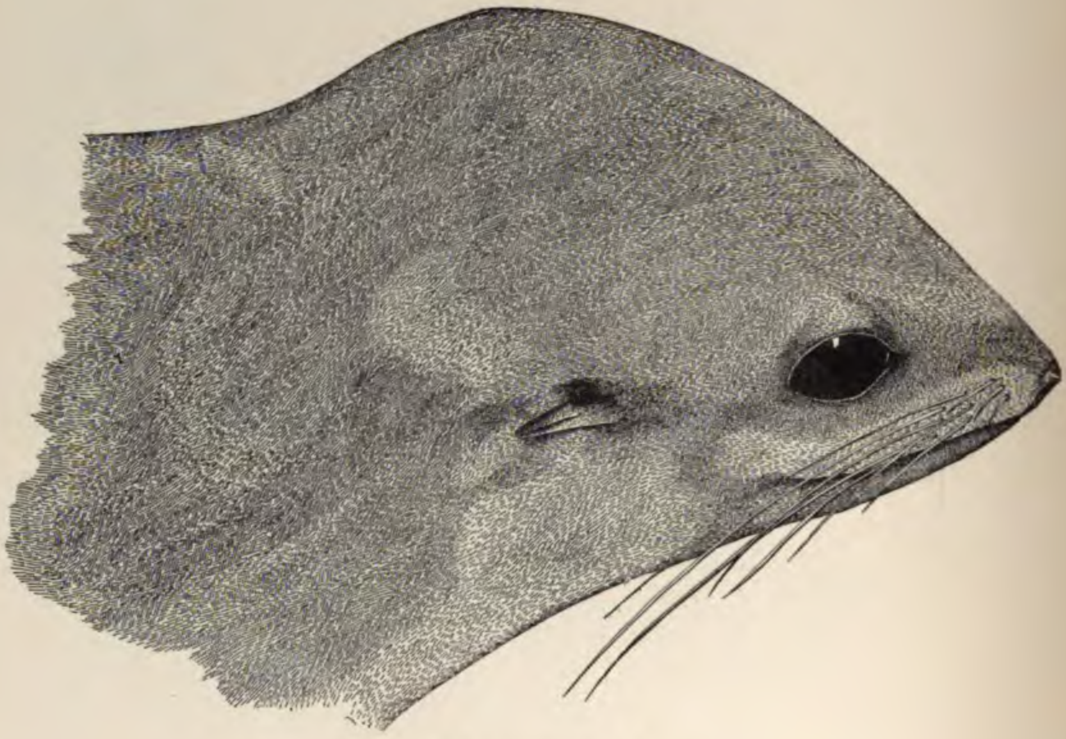
HEAD OF FUR SEAL PUP.

Drawn from nature by Bristow Adams.



HEAD OF FUR SEAL PUP.

Drawn from nature by Bristow Adams.



HEAD OF FEMALE FUR SEAL.

Drawn from nature by Bristow Adams.

HEAD OF A TYPICAL ROOKERY BULL.

Drawn from nature by Bristow Adams.

A TYPICAL ROOKERY BULL.

Drawn from nature by Bristow Adams.

the fourth year his neck begins to thicken and develop the "wig." After the wig has appeared the skin depreciates in value, until in the adult bull it has no value as fur.

THE HALF BULL.

In the fifth and sixth years the young male grows rapidly, and in size and appearance approximates the adult bull, but lacks his strength and courage. He is then known as a "half bull." The males under 7 years of age are not allowed on the rookeries, though they hang about the rear and in the water in front of them. The bachelors are forced to herd by themselves in separate bands on the hauling grounds.

THE IDLE BULL.

In addition to the half bulls there is a class of males called "idle" or "reserve" bulls. These are in no way different from the breeding bulls, but on account of the lateness of their arrival, the unfavorableness of their location, or because of defeat in battle, they have been unsuccessful in securing harems. They take up their places in the rear of the breeding grounds, or as near to them as they can get, and there they fight among themselves, watching for opportunities to invade the harems of their more successful rivals, and occasionally forming small harems by capture. Late in the season the idle bulls succeed to the posts vacated by the departing harem masters and take charge of the late arriving cows and the 2-year olds.

THE YEARLINGS AND VIRGINS.

The seals of 1 year old of both sexes are known as yearlings. There is no marked difference between the males and females at this age. The yearling males are found in the latter part of July on the hauling grounds with the older bachelors. The females come late to the islands and spend much of their time on the rookeries among the young of the year. They do not associate to any considerable degree with their brothers on the hauling grounds. The females of 2 years old are known as "virgins," and come on the rookeries late in July and early in August to be served by the bulls.

THE PUP.

The young of the fur seal or pup is black in color at birth, sometimes with a brownish strip under the throat and with a large whitish spot in the axil. Its weight at birth is about 11 pounds, and it is comparatively helpless, though it becomes able to care for itself in a short time. Its head is large in proportion to its body and proves a serious handicap in the early efforts of the animal to learn to swim, an art which it does not possess at birth. When the pup is about 3 months old it sheds its black coat and takes on a new one of gray. By this time it has learned to swim well and weighs 25 or 30 pounds.

THE MIGRATION OF THE SEALS.

THEIR SUMMER MOVEMENTS.

In their annual movements the seals of all classes with few, if any, exceptions visit each season the islands on which their breeding grounds are situated. The earliest arrivals come about the 1st of May; the latest to depart go some time in December.

In the interval the offices of reproduction are accomplished. The females come and go from the feeding grounds at intervals, caring for their young. The younger males spend most of their time resting on the sand beaches, visiting the sea irregularly. In November the females and young of the year leave the islands. The males, especially the bachelors, remain until December and even January, in mild seasons probably not all leaving the vicinity of the islands during the winter.

THE LIMIT OF MIGRATION.

The adult males and the older bachelors spend the winter in the Pacific Ocean, somewhat below the Aleutian Islands, and eastward in the Gulf of Alaska. The younger males go farther south. The pups probably reach the latitude of Cape Flattery. The adult females go farthest south, being found as low down as the Santa Barbara Channel, off southern California.

ITS COURSE AND DURATION.

The southward trip of the seals must be rapid and more or less direct to the turning point. The females do not leave the islands much before the middle of November, but are taken in the latitude of southern California early in December. On the return trip the movements of the animals are slower, the remainder of the winter and spring being occupied in the northward journey along the coast, which they follow at a considerable distance offshore. In December, January, and February they are found off the coast of California. They are in the neighborhood of Cape Flattery and Vancouver Island in March, April, and May; and in May and June they are found in the Gulf of Alaska and along the southern coast of the Aleutian Islands. They reach the islands at various dates according to the different classes of animals.

In this outline of the movements of the seals at sea only the general course of the herd as a whole is traced. A more detailed account will be found in connection with the migration chart prepared by Mr. Townsend and published in Part III of this report. In Mr. Luças's account of the feeding habits of the animals, also in Part III, the movements of the seals on their summer feeding grounds are more fully given.

CHAPTER V.

THE DAILY LIFE OF THE ROOKERIES.

THE ARRIVAL AT THE ISLANDS.

THE MALES.

The adult males arrive first at the islands in the spring. Their appearance is governed largely by the movements of the drift ice, which packs in about the islands late in winter and remains until the latter part of April, sometimes until late in May.* In 1895, when the ice remained thus long about the islands, making the landing of the bulls difficult, roads were cut in it, through which the animals hauled to reach their stations.

THE DATE OF THE EARLIEST ARRIVALS.

The average date of the landing of the first bulls, as shown by the record in the log of the islands, is about the 1st of May. Instances are recorded where the animals have landed on the ice and traveled in for a mile or more, taking up their places on the snow-covered rookeries. The incoming of the bulls is gradual. They appear almost simultaneously on all the rookeries, each being represented by one or two.† The number increases, slowly during the early part of May, rapidly in the latter part. By the middle of June, practically all of the regular harem bulls are located in their places on the breeding ground. During the season of 1897 a count of bulls on North rookery of St. George, June 7, gave 180, where 196 harems were found later in the season. On Kitovi rookery of St. Paul, a count of bulls made on the 12th of June gave 156, where 182 harems existed in 1896, and 179 later in the season of 1897.‡

THE OLDEST COME FIRST.

It is probable that the earliest bulls to arrive represent the veterans of many seasons, and that those arriving subsequently come in the order of their ages. Thus the young half bulls and the idle bulls as a class do not locate about the rookeries until the time of landing of the cows. They then haul out around the rookeries to places in the rear, or fight their way through the territory of bulls already in place. Some of them are doubtless successful in displacing earlier arrivals, or in gaining advantageous places on the breeding grounds. The young bulls for the most part in the beginning of the season hang about the water front and try to intercept the landing cows. It is only after the breeding season is well advanced that they are seen in numbers about the rear of the rookeries, and even then they come and go from the water more or less regularly.

---

* See extracts from log of St. Paul, Pt. II, under date of May, 1895.

† See extracts from log of St. Paul, Pt. II, May of any season.

‡ Daily Journal, Pt. II, under date of June 12.

THE BACHELORS.

The bachelor seals begin to arrive at about the same time as the bulls. Their first appearance about St. Paul is usually on Sivutch Rock. The average date of the first recorded food drives is about the 20th of May.[1] This, however, is not the date of their first arrival, but the one at which the animals are out in sufficient numbers to make a drive worth while.

The older bachelors come first. This is shown by the excess of older seals that are turned back in the earlier drives, and the larger percentage of killed in the number driven. This can best be made clear by citing the statistics showing the animals rejected, large and small, and the average per cent of animals killed, for the different dates during the season of 1897, on St. Paul Island:

Statistics of killings, St. Paul, 1897.[1]

Date.	Rejected.		Percentage killed.
	Large.	Small.	
June 15	144	119	0.65
18	130	26	.67
23	556	184	.48
26	402	214	.64
30	376	214	.57
July 1	288	224	.58
2	107	90	.53
5	229	175	.63
6	301	306	.67
8	355	551	.65
9	97	115	.68
12	140	638	.50
14	216	661	.58
16	391	586	.53
17	180	412	.66
19	377	1,174	.39
22	500	2,047	.34
23	161	698	.24
24	352	1,380	.23
26	491	890	.27
27	221	545	.20
29	298	1,114	.16
30	383	708	.20
31	118	456	.16
Aug. 2	350	1.440	.19
5	159	376	.15

[1] This record of rejected animals was, for the most part, kept by Mr. John M. Morton, whose duty as Treasury agent required his presence constantly on the killing field.

From this table it is apparent that among the rejected animals prior to July 9, those too large for killing predominated. The large percentage of animals killed for the total number driven shows that the greater proportion of the seals on the hauling grounds at this time were of killable age. After July 9 the smaller seals began to predominate, showing the advent of the 2-year olds and yearlings. About the same relative number of animals were killed in the later drives, but owing to the increase of little seals, the percentage steadily diminished from a maximum of 68 per cent to a minimum of 15 per cent.

THE BEGINNING OF THE SEALING SEASON.

It is not until the 1st of June that the regular driving for the quota begins. At this time the 3-year-old seals, from which the skins for the quota as a rule are taken, begin to arrive as a class. About the middle of July the 2-year-old seals begin to come in numbers, followed very soon by the yearlings, which swarm in large numbers on the hauling grounds during the latter part of July. As the breeding season advances the young half-bulls, which throng the earlier drives, withdraw from the hauling grounds to the water front of the rookeries or take up places in their rear.

---

[1] Log of St. Paul, Pt. II, May of any season.

The arrival of the younger males in the latter part of July makes it advisable that the driving for the quota should be completed as early in this month as possible. In the early days of American control, when the seals were numerous, the quota was, as a rule, filled before the 20th of July.

THE ARRIVAL OF THE COWS.

It is about the 10th of June that the adult cows begin to arrive.* Their appearance, like that of the adult bulls, is very gradual. In 1897 a cow appeared on East rookery on June 3; a second cow joined her on the 7th; no others had arrived on the 10th. On St. Paul, the first cow arrived on the 10th; a second appeared on the 12th, and after this date a few could be found at almost every point where harems were located the previous season. So quietly did the cows come in and take their places that, though the rookeries of St. Paul were kept under the closest scrutiny, and many new cows were found at each inspection, it was more than a week before the landing of a single cow could be noted.

THEIR INCOMING GRADUAL.

This quiet and gradual incoming of the cows can best be illustrated by the record of the daily count on Lukanin rookery:

Lukanin rookery, 1897.

Date.	Cows present.
June 12	1
13	1
14	3
15	5
16	6
17	11
18	19
19	25
20	37
21	52
22	74
23	103
24	131
25	176
26	207
27	257

Thus, though cows began to arrive on this rookery on the 12th of June, by the 27th of June there was on the half mile of its shore front no more than 257 cows. At this date few, if any, had begun to go to sea. When we contrast this number with the total of about 3,000 cows which visited the rookery during the season, we get some idea of the gradual arrival of the breeding females. These figures must also correct the long current notion that they come in a body or in a succession of great waves.

---

* For details of the landing of the cows here described, reference should be made to the Daily Journal in Pt. II, under date of June 12, 1897, and following.

It is probable that with the cows, as with the bulls, the date of landing is influenced by age, the oldest coming first. The fact that the young cows are first impregnated early in August, coupled with the fact that pups are born as early as the 10th of June, shows that there must be a gradual recession of the date of delivery, which may reasonably be supposed to correspond to the increasing age of the breeding animals themselves.

THEIR ARRIVAL NOT THE OCCASION OF FIGHTING.

The observations of the season of 1897 must also correct the tradition that the first appearance of the cows is the signal for a general battle among the bulls for their possession. Nothing could be further from the truth. There was in 1897 no general disturbance at this time nor during the month of June. No general recognition of the arrival of the cows was made by the bulls. The landing female reconnoitered the shore, swimming backward and forward until she was satisfied of the location, and then landed on the rocks, being taken in charge by the nearest bull. If the bull discovered the landing cow and attempted to secure her, she escaped to the water if she could; if not, she submitted to the inevitable, and took up her place beside him. Sometimes the escaping cow was overtaken by the bull and carried back. If the cow escaped, she usually returned to the same place, and in time was located there.

THE MANNER OF LANDING.

This represented the method of the earliest arrivals. The choice of the cow was limited to the place of landing. When a bull once obtained a cow, his harem became the objective point for all cows landing in its vicinity. The landing cow came in quietly and took her place among the others, in most cases without even the knowledge of the bull whose circle she joined. When he became aware of her presence, he gave her a cordial welcome, taking occasion to round up his harem and to show the new arrival marked attention. As a result of this desire of the cow to join the crowd, it happened that large harems were formed at favorite landing places which grew constantly in numbers, though the shore front on either side remained for the time being entirely wanting in cows. On all the massed rookery portions this became the regular method of development.

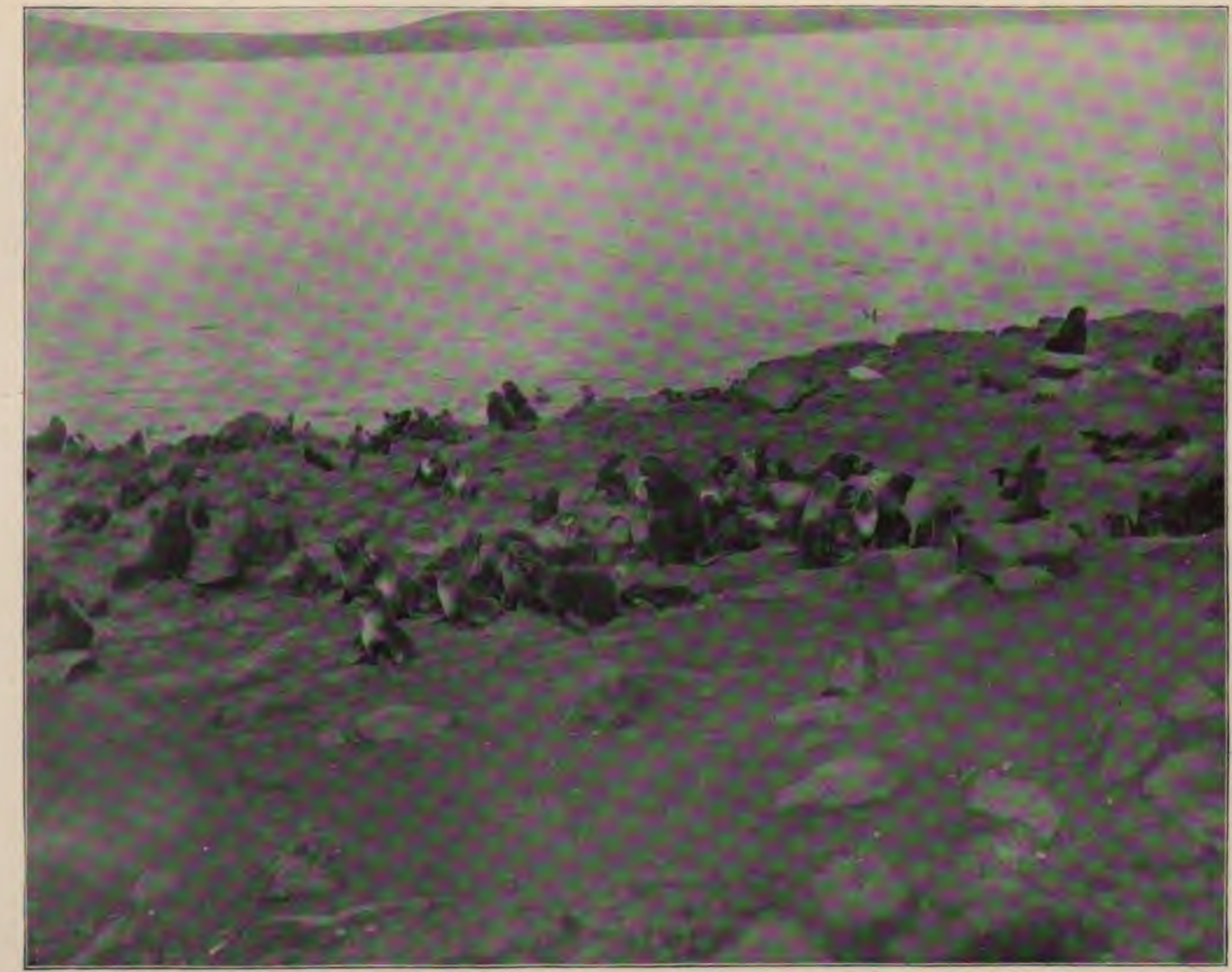
MASSED ROOKERY FORMATION.

The large mass of breeding seals on Tolstoi sand flat* was originally a single harem, which in the course of time numbered upwards of a hundred cows in charge of a single bull. So long as the cows lay quietly resting before and after the birth of their pups the single bull was able to control them all. But in time the task became too great, and when the cows began to come in heat in numbers, he soon lost control of them. The idle bulls about him entered the circle. He was unable to exclude them, and in time a large number of bulls controlled the mass in common, apparently without clearly defined harems. With the podding and scattering of the pups and the influx of new cows, the seals became spread out over larger areas, and new bulls were taken into the circle until the farthest limit of expansion was reached.

What was true for Tolstoi was true also for the great breeding masses on the other large rookeries. Under Hutchinson Hill, the great mass occupying this space

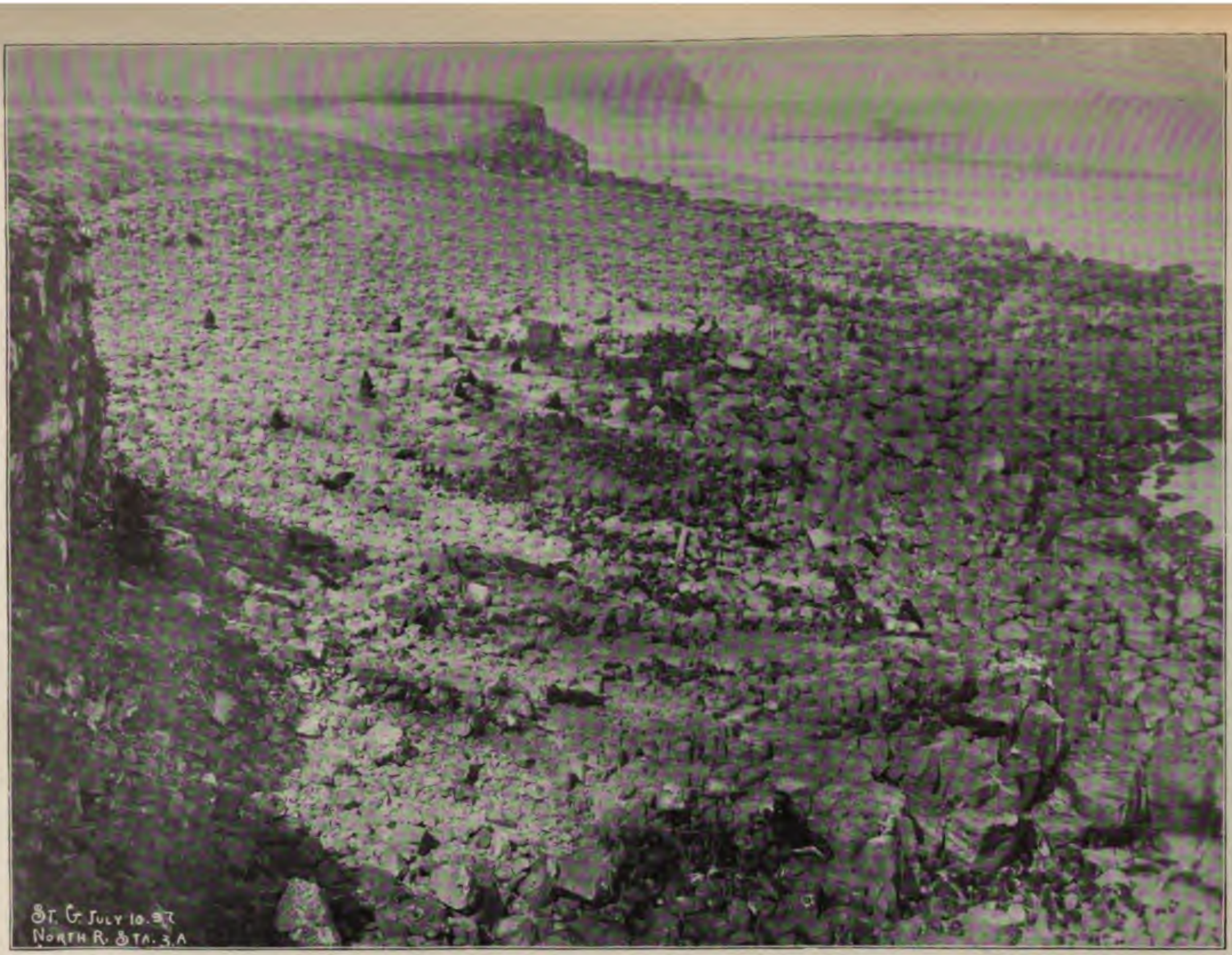
---

* See plate opposite p. 40.



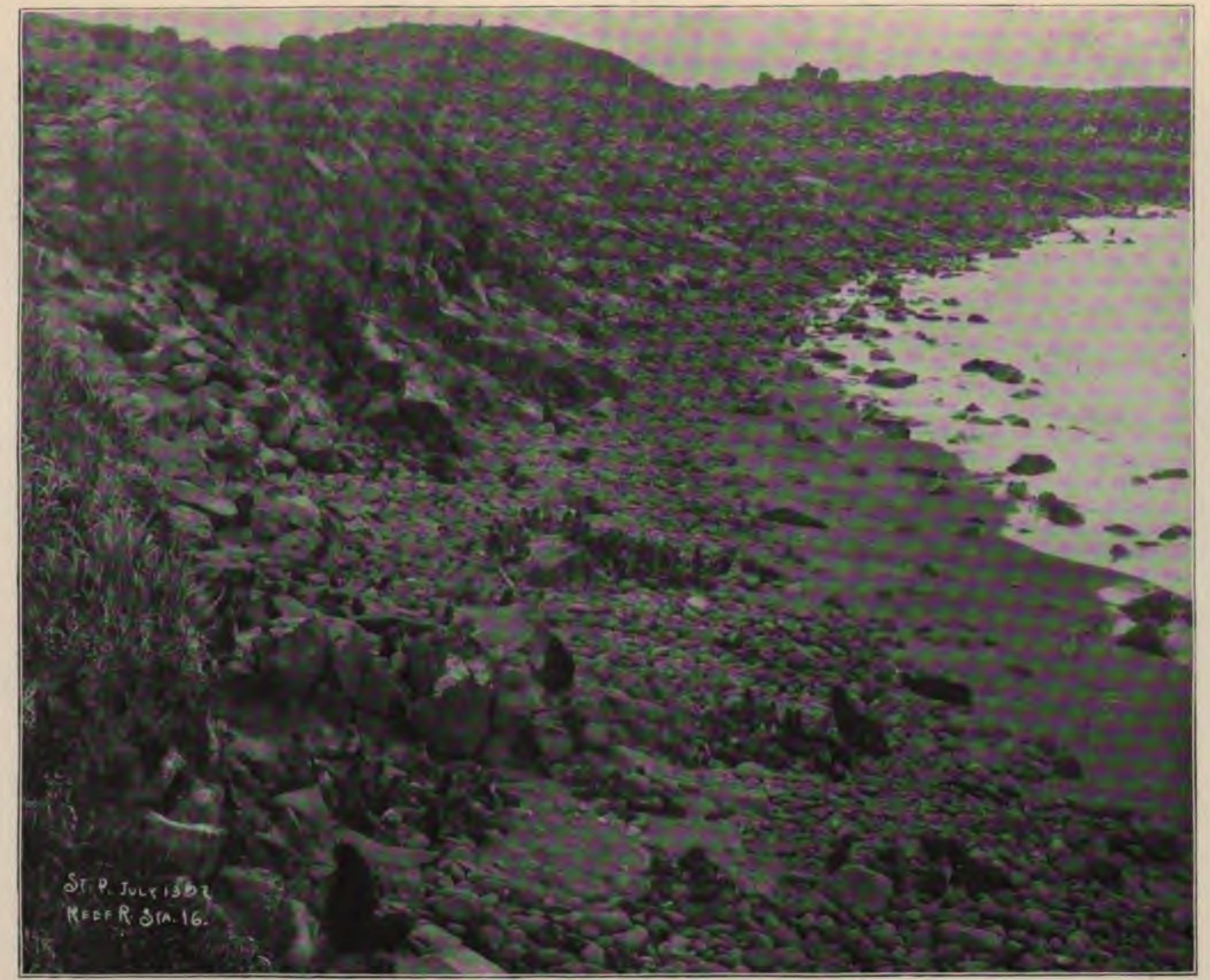
A HAREM IN AUGUST ON GORBATCH ROOKERY, SAINT PAUL ISLAND, SHOWING BULL, COWS, AND PUPS.

Photograph by Chichester.



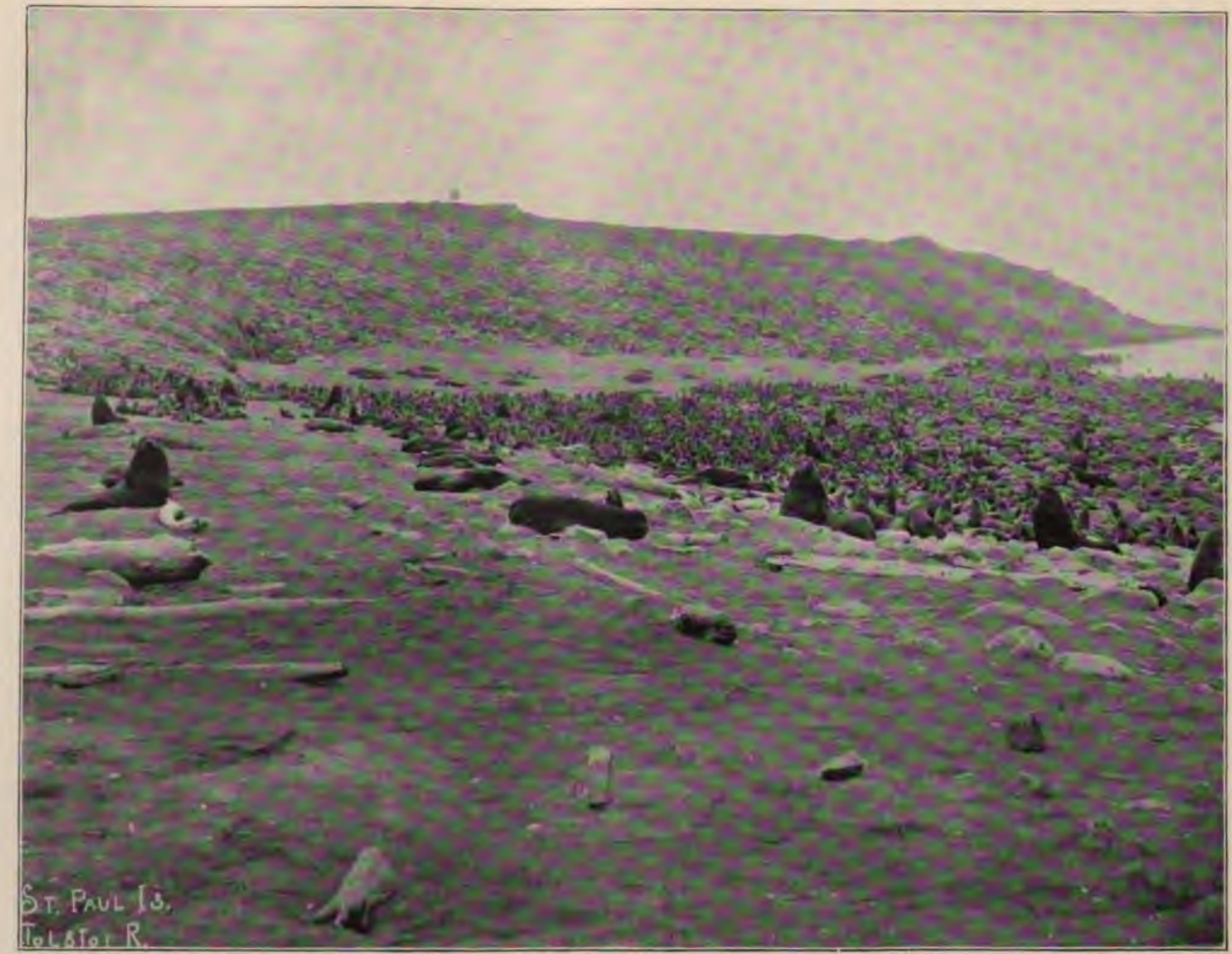
A PORTION OF NORTH ROOKERY, SAINT GEORGE ISLAND, JULY 10, 1897, SHOWING THE BEST TYPE OF ROOKERY GROUND.

Photograph by Chichester.



A PORTION OF GORBATCH ROOKERY, SAINT PAUL ISLAND, SHOWING THE HAREMS OCCUPYING THE BOWLDER BEACH AT THE FOOT OF ABRUPT CLIFFS.

From a photograph by H. D. Chichester.



A VIEW OF TOLSTOI ROOKERY, SAINT PAUL ISLAND, SHOWING THE SEALS MASSED UPON THE SAND PLAT AND BOWLDER BEACH.

Photograph by Chichester.

was, on June 28, represented by four of these monster harems located at intervals along the shore and projecting but slightly above the bowlder beach. They were then on the point of breaking, and already around the edges were numbers of small harems of one or two cows which had plainly been stolen from the larger mass. In the course of a few days thereafter the disintegration of these abnormal harems began, and they became broken up into numerous smaller families under hitherto idle bulls. The seals later became spread back over the entire flat. A similar course of development marked the formation of all the large masses on Reef rookery.

Where the rookeries occupied the narrow bowlder beach, as on Kitovi and Lukanin, Lagoon or Gorbatch, the distribution of the harems was more regular, and when the period of scattering and fusion came, they were united in a more or less even band throughout the entire length of the rookery.

DAILY ROOKERY COUNTS.

With a view of determining the relative condition of the rookeries from day to day, daily counts were begun on Lukanin and Kitovi rookeries with the first arrival of cows and were kept up throughout the season, or from June 12 to July 31. A part of the record of these counts has already been given to illustrate the arrival of the cows. The full record will be found in Appendix I. The following is a synopsis of the count on a part of Kitovi rookery known as the Amphitheater:

Synopsis of Kitori rookery, 1897.

Date.	Cows present.
June 14	2
21	9
26	76
29	168
July 1	246
5	499
15	703
20	429
31	375

THE HEIGHT OF THE SEASON.

These counts show that the population of breeding cows gradually increases from the beginning of the season, about June 10, until a climax is reached about the middle of July. It then decreases until at the close of the breeding season, about August 1, it numbers about one-half the maximum population present at any one time, or about one-fourth of the actual rookery population. There is a temporary fluctuation during the first ten days of August, while the virgin 2-year-old cows are present on the rookeries. For the rest of the season the adult population remains at about the point reached at the end of July, probably varying more or less from day to day according to the condition of the weather.

It had until 1896 been currently believed that at the period known as the "height of the season," say from July 10 to 20, rookery conditions were fixed and all or practically all the breeding animals present. The counting of pups in August in 1896 first dispelled this error, by showing that the pups outnumbered two to one the breeding females counted in the height of the season.

FLUCTUATIONS OF POPULATION.

The daily counts of the breeding season of 1897 may here again be cited to give an idea of the real condition of the rookeries at their maximum. The following figures are for that part of Kitovi rookery called the Amphitheater, which contained, according to the count of pups made on August 3, about 1,245 breeding females for the season:

Amphitheater of Kitovi.

Date.	Cows present.
July 10	660
11	703
12	....
13	654
14	556
15	703
16	678
17	698
18	566
19	556
20	429

Such is the height of the season. The actual count shows a difference of 6 per cent between its beginning and its maximum and a difference of 38 per cent between the maximum and its close, while between two individual days of the period there is as great a difference as 20 per cent.

INCREASE OF FAMILIES.

Nor is the fluctuation in individuals all that is to be noted in this consideration of the height of the season. The following count of harems on this same breeding ground shows equally important results:

Amphitheater of Kitovi, 1897.

Date.	Harems.
June 14	1
20	3
30	10
July 8	35
13	46
25	53

It is thus apparent that during this time of supposed rookery stability the number of harems underwent quite as marked a change as did the number of individual animals composing them. The daily observations of this breeding ground and frequent photographs of its area show, moreover, that the extent of ground occupied grew steadily from day to day.

WHAT THE HEIGHT OF THE SEASON MEANS.

What the height of the breeding season really means, therefore, is a time in rookery development when the stream of incoming cows about equals the stream of outgoing ones. It is the time when the greatest number of cows are actually present at one time. It marks the maximum of rookery development, which probably covers no more than a single day. In observing the rookeries the eye can not adjust itself readily to the change, and the result is that the period seems to comprehend several days.

From about the 10th or 12th of June onward new cows are constantly arriving on the rookeries. About ten or twelve days after her arrival each cow goes away to feed for the first time. The first arrivals and first departures therefore run roughly in parallel lines. A disturbing element is brought in by the return of cows from feeding and their subsequent departure and return at intervals. All these various elements result in a period of apparent equilibrium at about the 15th of July, which is the height of the season.

THE PERIOD CURRENTLY MISUNDERSTOOD.

That this period of rookery development should have been misunderstood is not strange, since the matter was never before tested by mathematical standards. Events in rookery life, though recurring by the thousands, are difficult of observation. Their very multitude distracts the observer. In the summer of 1897, at the maximum period of rookery life, when thousands of pups were being born, the closest observations, extending at times through nine hours a day, failed to disclose the actual birth of more than a dozen pups. Under this same close scrutiny it was a week after the first landing of cows before one could be discovered in the act, and a much longer period elapsed before the departure of one could be observed. General observations of the rookeries have therefore only relative value unless they are checked by figures. They can be trusted to show large results, but can not be relied upon to indicate normal changes. To get definite results, exact enumerations and minute observations are necessary.

THE BIRTH OF THE PUP.

Within a period of from six to forty-eight hours after her arrival the cow gives birth to her pup. After a further period of five to six days she comes in heat and is served by the bull. Five to six more days pass, during which time the pup grows rapidly and becomes able to take care of itself; then the mother goes to sea to bathe and feed. Her first return is possibly within three or four days. Of her subsequent returns no record has been possible, but from the gradual decrease in the number of cows present after the height of the season is reached, it must be inferred that the time of absence lengthens as the pup grows older and is able to remain longer without food. As the cow does not leave the harem until after impregnation it necessarily follows that adult cows whenever found at sea are pregnant.

THE FEEDING OF THE COWS.

When the cows first enter the water after their long rest on the shore they exhibit every evidence of genuine satisfaction and pleasure. They do not at once swim away, but play about, rolling over and over in the water, scratching and rubbing themselves with their flippers, getting thoroughly cleaned from the filth of the rookeries. This done, the animals swim away to the feeding grounds.

SWIMMING SEALS.

During the breeding season a band of sleeping, playing, or swimming seals skirts each rookery front. Some are plainly bachelors, but most are cows. This band of seals evidently represents the animals preparing to depart and those just arriving. No one ever sees a seal landing directly from the sea; and one seldom sees a seal leave the rookery to go directly out to sea, though at a distance from land, as on our trips to Otter Island, numbers of the animals were seen going rapidly out to sea and coming in in the same direct manner. The incoming seal doubtless quietly joins the outer edge of the group of swimming seals, becoming one of them in their motions and pastimes, gradually working to the shore when ready to go on the rookery. The departing seal, in like manner, evidently takes its place among the swimming seals and when ready slips away from them on the outer side.

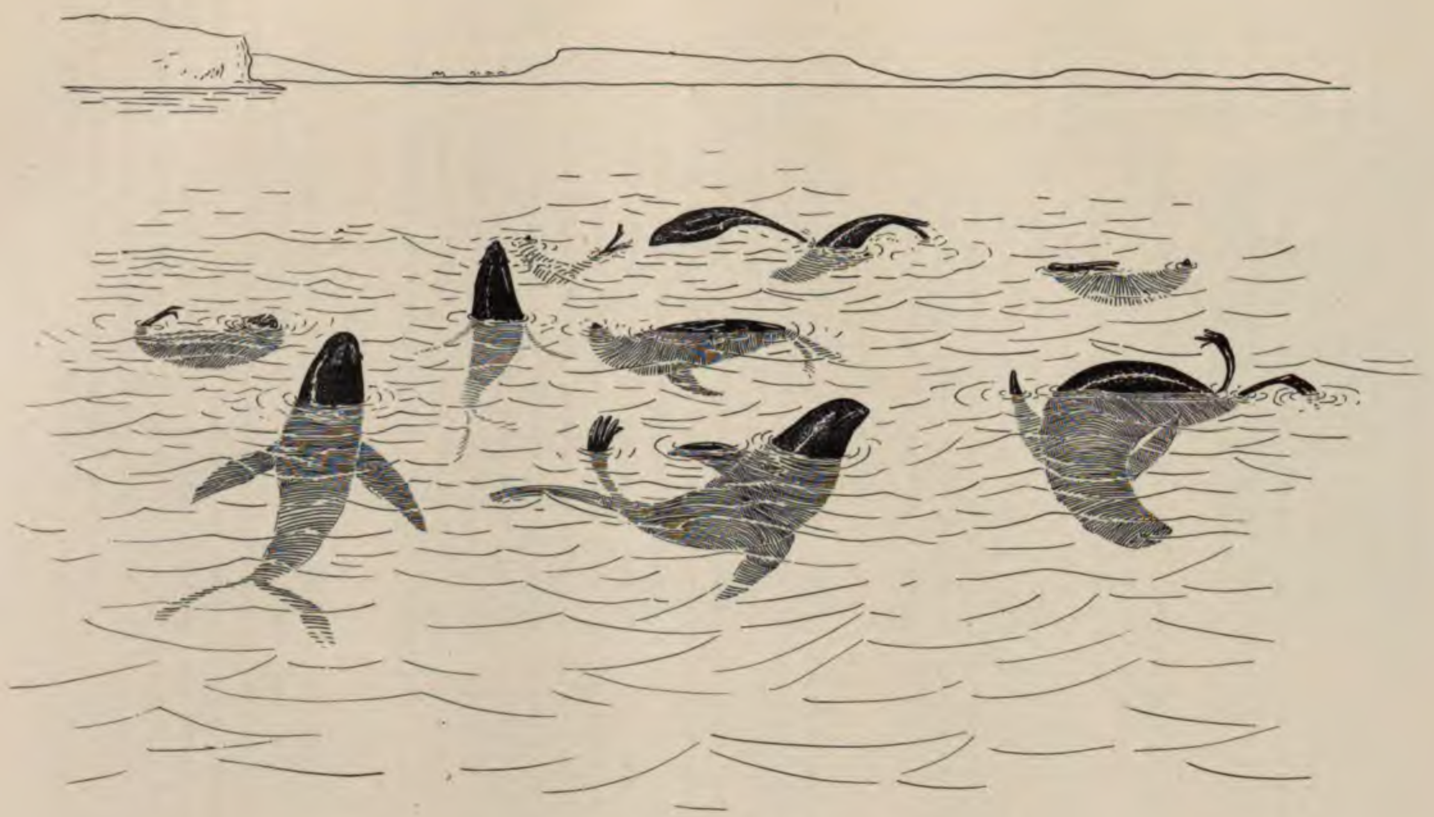
The tendency on the part of the seal on first going into the water to loiter and enjoy a bath accounts for the delay of the departing seals; but in case of the arriving seal something more definite must keep the tired animal, eager for her hungry pup, from landing at once. The reason for this seems to lie in the feeding habits of the animals. The bachelors, as has long been noted, are never found with food in their stomachs, whether taken on first landing in the spring or later in the season. It has been erroneously supposed on this account that they fasted more or less throughout the season. In the summer of 1896, however, a large number of cows were either directly killed or examined after accidental death and their stomachs also found to be devoid of food. Even the stomach of a cow dead from choking on a fish bone was empty. The cows are, of course, absolutely known to feed.

THE SEAL DIGESTS ITS FOOD IN THE WATER.

It seems necessary, therefore, to find some more rational explanation for the absence of food in the stomachs of animals taken on land. This explanation seems to be that digestion with the fur seal is completed in the water, and that if not so completed before it reaches land, the animal loiters offshore until it is accomplished. This explanation accounts for the empty stomachs of bachelors as well as cows. It also explains the reason why the cows do not come directly on shore from the sea. The fact that digestion is thus accomplished at sea also accounts for the relatively small amount of excrement to be seen on the rookeries compared with the number of animals. It is voided at sea.

THE EVIDENCE OF THE PUPS.

In the investigations regarding the feeding of pups carried on during the fall of 1896 some additional light was thrown on this subject. Where the animals were killed while swimming or sleeping in the water, they were found almost without exception to be well filled with milk. Where they were killed on the rookeries, they were as a rule empty or had little milk. The conclusion seems warranted that the little fellows, after learning to swim well, spend most of their time in the water after feeding and come on shore when hungry to await the return of their mothers. That their presence in the water was connected with the digestion of their food was borne out by the fact that in October, when hundreds of pups were playing and sleeping just offshore from the sand beaches of Zoltoi, Lukanin, and English Bay, the sands were strewn with pup excrement washed up by the receding tide, together with the shells and pebbles.



ATTITUDES OF FUR SEALS IN THE WATER.

Drawn from nature by Bristow Adams.

THE FASTING OF THE SEALS.

It is of course known that the fur seals are probably capable of abstaining from food for greater or less periods. Thus the cows evidently do not leave the rookeries on their first landing within ten to twelve days. Whether such periods of abstinence from food are regular or not, we do not know; but that the bachelors and cows do not fast for any considerable part of the summer is plain, if for no other reason, from the fact that they maintain a uniform condition throughout the season, always showing a plentiful supply of blubber, but appearing in no better condition at one time than another.

The bulls, on the other hand, which do undoubtedly fast, on coming ashore in the early spring are loaded down with blubber, which is gradually absorbed, leaving the animal thin and greatly reduced by the time the breeding season is over. There is abundant reason why the bulls should fast, for it would be impossible for them to leave their places, and nature has made provision for their necessities. A similar provision seems to be made for the period of fasting which the newly weaned pup must probably endure after going to sea on the winter migration, before it has become proficient in the new art of fishing. During the months of October and November, and up to the time of their departure, the pups grow excessively fat.

THE HAREM.

The unit of life on the rookeries is the harem. The rookeries themselves are merely great bands or masses of harems grouped together along suitable beaches. The average size of a harem, as found from the enumerations of 1896 and 1897, is about thirty females to a single bull. The minimum and maximum limits range from a single cow to 150. The single cow harems are formed generally in proximity to large harems, and are as a rule the result of stealing on the part of idle bulls. Such bulls, when the harem master's attention is taken from his charges, rush in, seize and carry off cows bodily. It is rarely that such pirate harems can be made to exceed a single cow, as the animal must be held against her will, and in the effort to secure a second the first one usually escapes. Sometimes, however, through the voluntary desertion of cows from the large harems, it happens that these small harems rival the original ones in size and are again subject to pillage by other idle bulls still further in the rear. These small harems are found chiefly in the rear of and on the flanks of the large breeding masses, such as on Tolstoi, Reef, and Vostochni.

LARGE HAREMS.

The excessively large harems are the result of accident or favorableness of location rather than strength or prowess in the bulls. They are to be found in isolated stations and where peculiar angles and turns of the breeding ground hem them in. Thus on Gorbatch rookery a large bull held in his charge a group of 150 cows for a week or ten days.* When allowance is made for absentees, this harem must have numbered between 200 and 300 cows. Behind this bull and his family were a score of idle bulls lying about on the cinder slope. The secret of his success lay simply in the fact that the harem occupied a triangular piece of ground bounded on two sides by precipitous cliffs, and it was only necessary for the bull to guard the neck of land connecting with the slope. He, however, held the cows only during that period when they are quiet and resting after the birth of their pups. When the animals became restless and demanded attention in numbers, the large mass was presently broken up into a number of smaller harems in charge of the rival bulls, which could no longer be held in check.

---

* Daily Journal, Pt. II, under date of July 15, 1897.

HAREM SIZES.

But such large harems were exceptional, though harems numbering 50 cows were not so rare where the conditions were favorable. The following is a section of Kitovi rookery, counted by individual harems, which will give an idea of the diversity in their size:

A portion of Kitori rookery, July 13, 1896.

25	85	14	30	8	25	60	30	3	4	7
10	48	2	11	24	21	2	12	10	1	17
13	30	1	10	3	1	2	12	3	35	2
72	16	30	3	4	25	6	2	55	25	2
45	24	7	12	11	20	7	18	9	36	6
1	51	16	58	25	6	60	24	3	30	19
14	1	1	12	20	1	24	5	20	25	12
15	21	9	2	17	4	15	20	25	14	9
20	3	1	10	15	2	24	7	2	2	40
5	50	10	10	4	3	2	40	35	3	4

HAREM DISCIPLINE.

In the management of the harem the bull is an adept. Whether he has five cows or fifty, he is master of the situation. His will is law. Not that it is always tamely accepted as such, but the result is the same. If a cow becomes restless and moves about, a warning growl usually quiets her. If the movement is persisted in and an attempt to escape evident, the bull is up at once with a show of fierceness and in chase. He may simply strike the cow down with his open mouth. Often in doing so his sharp canines tear a gash in her skin. He may even seize her in his mouth and deliberately throw her or carry her back into the harem. If the cow thinks she has a chance to get away, she may try to outrun the bull. If she miscalculates the distance, he seizes her by the skin of the back and restores her, sometimes in a torn and bleeding condition, to the family circle. As a rule, however, the cow avoids this seizure by turning and facing the bull, biting him in the breast and neck. The bull then, by gradually pushing her before him, forces her back into the fold.

THE DEPARTURE OF THE COWS.

These persistent efforts to get away are made by the cows who are ready to leave for the water. The cows are not allowed to go until they are served. The bull's actions seem to be based upon a desire to be absolutely sure and to take no chances. The cow, when forced against her will to stay, bides her time, and when the bull is asleep she slips away unmolested. It frequently happens that she has to run the gauntlet of a band of young bulls which are stationed along the water front and are always ready to intercept the departing cow. The cow shows much skill and shrewdness in outwitting them. Once in the water her superior quickness enables her to outswim her pursuers. In one or two instances a chase of this sort could be traced for a half mile or more out to sea by the dolphin leaps of the animals as they rose above the surface to breathe. These instances were chiefly to be seen late in June, before the band of seals off the rookery front was large enough to furnish protection to the departing cows.

METHODS OF DISCIPLINE.

In the ordinary discipline of the harem a growl from the bull usually quiets the cows. This growl is also forthcoming when the cows quarrel among themselves, as they frequently do. Sometimes it is necessary for the bull to get up and quiet them by chuckling and scolding over them, apparently in a tone of remonstrance.

At times, even when his cows are all asleep, the bull rouses himself up and by encircling his harem and whistling, chuckling, and snarling starts the cows up and crowds them together. No apparent reason for such action can be seen. It seems on the face of it an unnecessary exhibition of authority, which, however, may serve some purpose. Having rounded up his harem, the bull may return to his favorite sleeping spot to resume his nap, or he may pick a quarrel with his neighbor.

THE FIGHTING OF THE BULLS.

At times the young bulls, in attempting to reach the rear of the rookeries without going around, break through the line of harems. Their entrance into the rookery confines sets everything in an uproar. Each bull into whose domain he comes attacks the intruder and passes him along to the next. Occasionally some over-valiant bull goes too far from his harem. The idle bulls are on the alert and seize the occasion to carry off cows. In very rare instances an idle bull may step in and take the whole harem, whipping out its rightful owner when he attempts to return. So, over the whole section of the rookery thus stirred up, fighting ensues and confusion reigns. In the height of the breeding season such incidents are of hourly occurrence.

THE EARLY FIGHTING OVERESTIMATED.

It is in the height of the season, and then alone, that the excessive fighting among the bulls occurs. It has been currently supposed that from the period of the landing of the first bulls they were engaged in defending their positions in bloody battles; that a truce resulting from these first contests for places was gradually established; that this was broken on the arrival of the first cows, when a period of desperate and spasmodic fighting began.

Such, however, was not the case in 1897, and has probably never been the case. As the bulls spend the days, after the breeding season is over, in resting and sleeping in good fellowship on the sand beaches, so they seem to spend the period of waiting, prior to the arrival of the cows, in sleeping and resting. At the time of our landing at St. George, on June 7, it could not be determined from the deck of the vessel, anchored but a few rods off the rookery, whether it was occupied or not. With a glass a few bulls could be seen. On close inspection the beach was found to contain 180 adult bulls evenly distributed over the rookery territory. When disturbed they roused up and roared both at the intruder and at one another; but they soon returned to their sleep. There was no commotion, no excitement. When pressed too closely they gave evidence of willingness to yield their ground. No test of whether they could be driven off was deemed advisable. There was no fighting among them at that time nor any apparent inclination to fight voluntarily. That no marked fighting had occurred previous to this time was evident from the fact that but few wounds or fresh scars could be seen upon the animals. In this regard they were in marked contrast to their condition in the middle of the season, when the harem bull or idle bull that did not show gashes about the breast and shoulders was the exception and not the rule.

At this early date the bulls not only did not pay any attention to one another, but even allowed the bachelors to occupy places among them and to haul out where they pleased. Later in the season this could not have occurred. A bachelor or young bull then appearing within range of an adult bull was violently attacked.

NO FIGHTING OVER ARRIVING COWS.

As the description of the arrival of the cows has already indicated, there could be nothing more incorrect than the reported battles over them. To the first arrival of the cow the bulls are utterly indifferent except where she becomes the object of capture by a particular bull. Once in the harems, the cows receive little attention even from their lords after the first brief welcome and absolutely none from other bulls. This was but natural. The landing cows were heavy with young. These must be born and a period of a week elapse before they could become an object of interest to the bull. The attitude of the bull at the outset was one merely of defense or struggle for possession. He was not influenced, as he was later on, by sexual excitement.

The real period of struggle and contest on the rookeries occurred after the 1st of July, when the cows began to come in heat in large numbers. From this time on to the close of the season more or less fighting could always be seen.

FIGHTING INFLUENCED BY SEXUAL INSTINCT.

When the breeding season was over and the bulls had returned to the sand beaches from feeding, their fighting instincts were plainly gone and they could be gathered up and driven about like the bachelors. In securing specimens for dissection or other purposes, two or three men could round up from 400 to 500 bulls on Zoltoi sands and drive them over to the killing grounds. They could be handled and driven exactly as sheep are. In the breeding season a dozen men could not move one of these bulls from his place or make away with him otherwise than by killing him. His courage and fighting qualities are simply boundless in the defense of his harem. He will not interfere with the observer who keeps at a reasonable distance, but when too closely approached he will charge fiercely and quickly, and the adult bull on the breeding grounds is about as dangerous as a bear. Judging from the way in which they tear one another, a man would fare badly in their clutches. The bull, however, does not follow up his enemy beyond a certain point, and always returns to his real or imaginary harem. This makes escape an easy matter. The chief source of danger in getting about among the bulls is in the possibility of slipping or stumbling on the rocks, or of running into the range of a sleeping animal while escaping from another. One can not always easily distinguish, in the foggy atmosphere of Bering Sea, the idle bulls from the stones among which they lie. That no accidents have occurred to the various investigators from the attacks of bull seals is due to the wholesome caution and respect which their courage and apparent capacity for mischief have inspired.

A ROOKERY DISPUTE.

Drawn from nature by Bristow Adams.

e drive
ime no
ad occ
fresh s
contras
bull th
not th
A
but e
they
bull

be
of
ca
fr
Th
b
t
f

A DEFEATED BEACH MASTER.

Drawn from nature by Bristow Adams.

MANNER OF FIGHTING.

Much of the so-called fighting, especially among the harem bulls, is a species of "bluffing" accompanied by a good deal of roaring and blowing, but ending without injury. The signal for such a performance is a challenging roar on the part of some bull and an answering roar from the challenged bull. The two animals approach each other, and when at a certain distance apart, both strike out with that long serpent-like stroke characteristic of the seal. In making the stroke the bulls let themselves down with their breasts on the ground, and, after puffing out their musky breath, which forms a cloud in the cool, moist air, they right themselves and, standing for a minute with averted heads, return to their places.

REAL FIGHTING.

These are merely exchanges of friendly greetings between the harem masters. Between the harem masters and the idle bulls, or between individuals of the latter class, the matter is more serious. The same preliminaries are gone through with, but the stroke does not fall short and end in fiasco. The aim is taken for the foreflipper at the angle of the body, and if it is true, a deep red gash is the result. But the animals are expert in averting the attack by throwing the flipper under the body. Failing in reaching the coveted point of attack, a compromise is made, each animal seizing the other by the skin of the shoulder or breast, wherever the hold can be obtained. They then clinch and tug and strain in their efforts each to overturn the other or to push him from his place. The strength of the powerful jaws is such that not infrequently a great gaping rent in the tough hide is the result. If, however, the hold is firm, and one animal is strong enough to push the other, this ends the fight, the one yielding giving it up. If the animals are more evenly matched, after each clinch they return to renew the struggle in a species of rounds, gauged by the endurance of the bulls. They are soon fatigued on land, as they have difficulty in getting breath, and any exertion must be of short duration.

That some of these fights are continued until one or the other of the animals dies of exhaustion, is abundantly proved by the bodies of dead bulls found on the rookeries and especially in that territory occupied by the idle bulls. On Zapadni rookery no less than ten of these animals, freshly dead, were seen about the middle of July. The bodies were torn and gashed, but none of the wounds were capable of causing death, which probably resulted directly from exhaustion.

THE TREATMENT OF THE COWS.

The fights between the harem masters and the idle bulls are at bottom due to the attempts of the latter class to steal the cows. When an idle bull steals a cow, he is usually attacked by her master. Sometimes he drops the cow, which returns to the harem while the bulls settle the account. It sometimes happens, however, that the master or perhaps a third bull seizes the cow and she is pulled about until one or the other hold loosens. Doubtless a certain number of cows are literally torn to pieces in this way. One was seen on Kitovi rookery to lie limp and insensible for five minutes after being thus treated. She afterwards crawled away, evidently seriously hurt. That the number of cows killed by the bulls in their struggles or by the rough treatment of the harem masters is considerable is shown by the fact that no less than 42 dead cows were found in the season of 1897 on Reef rookery, the majority of which were so torn and mangled as to point to the harsh treatment of the bulls as the probable cause. Other cows were found dead from similar cause on all the rookeries. In 1896 131, all told, were thus counted.

The bulls are anything but gentle with the cows. Examples of their rough treatment can at any time be seen on the rookeries. Living cows, cut and slashed and torn, are everywhere visible. In most cases the injury is due probably to accident rather than intention. In one case, however, on Lukanin rookery during the summer of 1897, a bull simply bit and worried a stolen cow until he killed her. When first seen she was considerably torn, having been stolen from a neighboring harem by her master, an idle bull. She was restless and kept making constant efforts to escape. The bull treated her roughly, but while observed was not seen to injure her seriously. At every time the rookery was subsequently inspected, however, she was found to be in worse condition, until after two days she was found dead. The bloody jaws and front of her master showed plainly who was responsible. The body was recovered and the skin taken and tanned as a specimen of the wanton cruelty of the bull.

THE WOUNDS OF THE FUR SEAL.

The attitude of the fur seals toward their wounds is striking. There is no attempt to nurse, lick, or otherwise notice them. A bull, whose foreflipper is hacked and bleeding, his every movement lacerating still further the injured muscles, may be seen rushing about, rounding up his harem, bidding defiance to every idle bull within reach. A cow may be seen going about with a flap of skin 6 inches square torn from her back. A pup was seen from whose side the skin and blubber was torn and hanging in a flap, leaving the intestines bare, and it was still a lively and apparently cheerful pup. A bull in attempting to carry off a cow from a harem was attacked by the owner of the cow. Instead of dropping her and defending himself he clung to her and took his punishment, struggling on. The harem master seized him by the exposed flank, and when he released his hold, after almost overturning the bull, the blood gushed out from the holes made by his ugly canines. The thief escaped with the cow and added her to his small harem of two. In his self-satisfied perambulations about his family group he soon made a space of about 10 feet square crimson with his blood. The next day the bull was just as pugnacious as ever, and even made an attempt to steal a fourth cow. His wounds, of which he had many, were a source of no apparent annoyance to him.

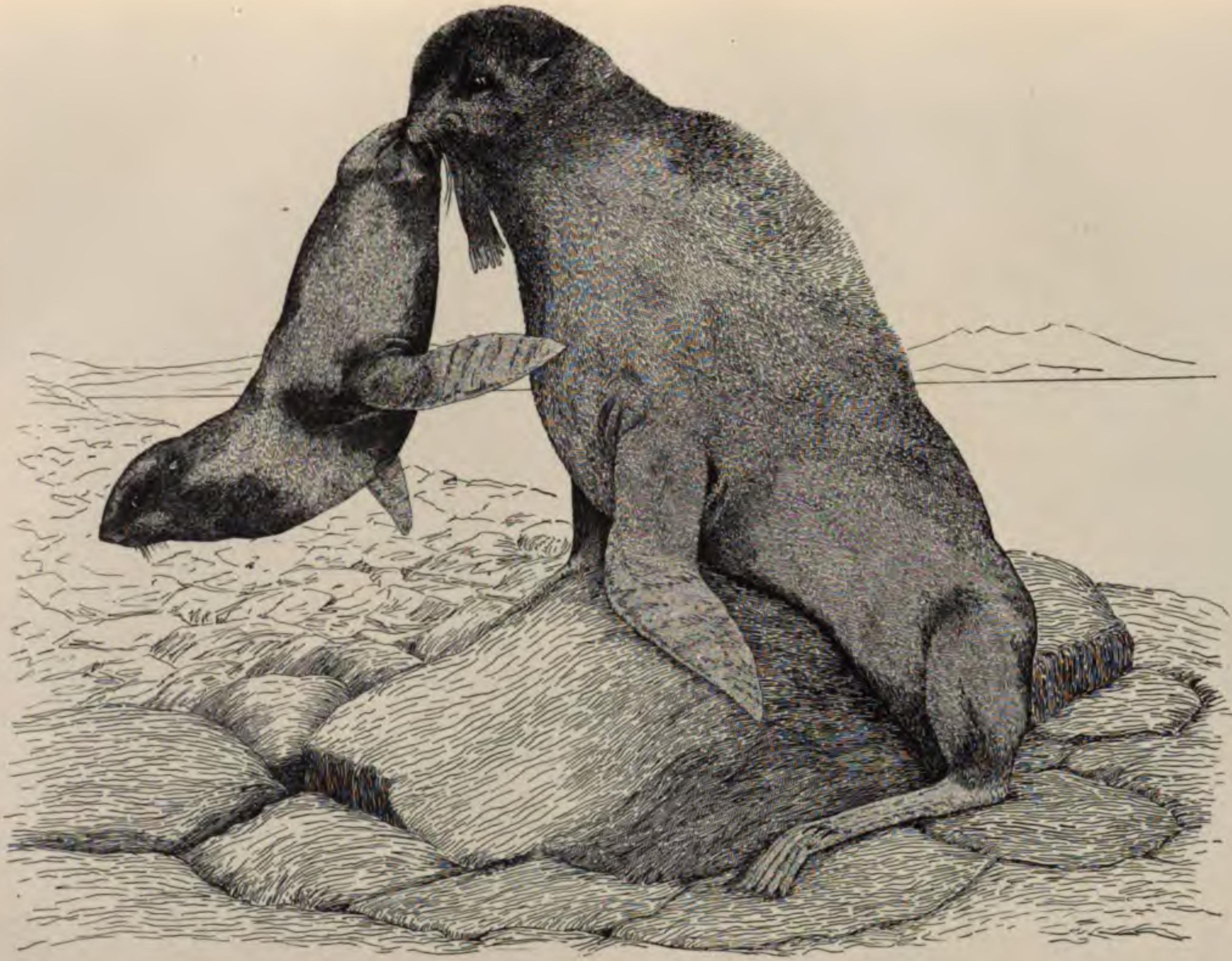
The thick coating of blubber under the skin with which the seals of all classes are lined is doubtless not very sensitive, and this, not the muscles, is torn and lacerated. The climatic conditions, the salt water, and the absence of flies render the healing of the wounds rapid, and by the middle of August but few traces remain, except the welt or scar in the skin which at times results from imperfect healing. The wound which so many bulls receive at the angle of the foreflipper is usually kept gaping open to such an extent by the movements of the animals that a perpetual scar remains.

THE INSTINCT FOR FIGHTING.

The fighting among the bulls has evidently been a feature of the breeding grounds so long that it has become an instinct with the males. On every hauling ground the bachelors of all ages are constantly going through in play the movements of their

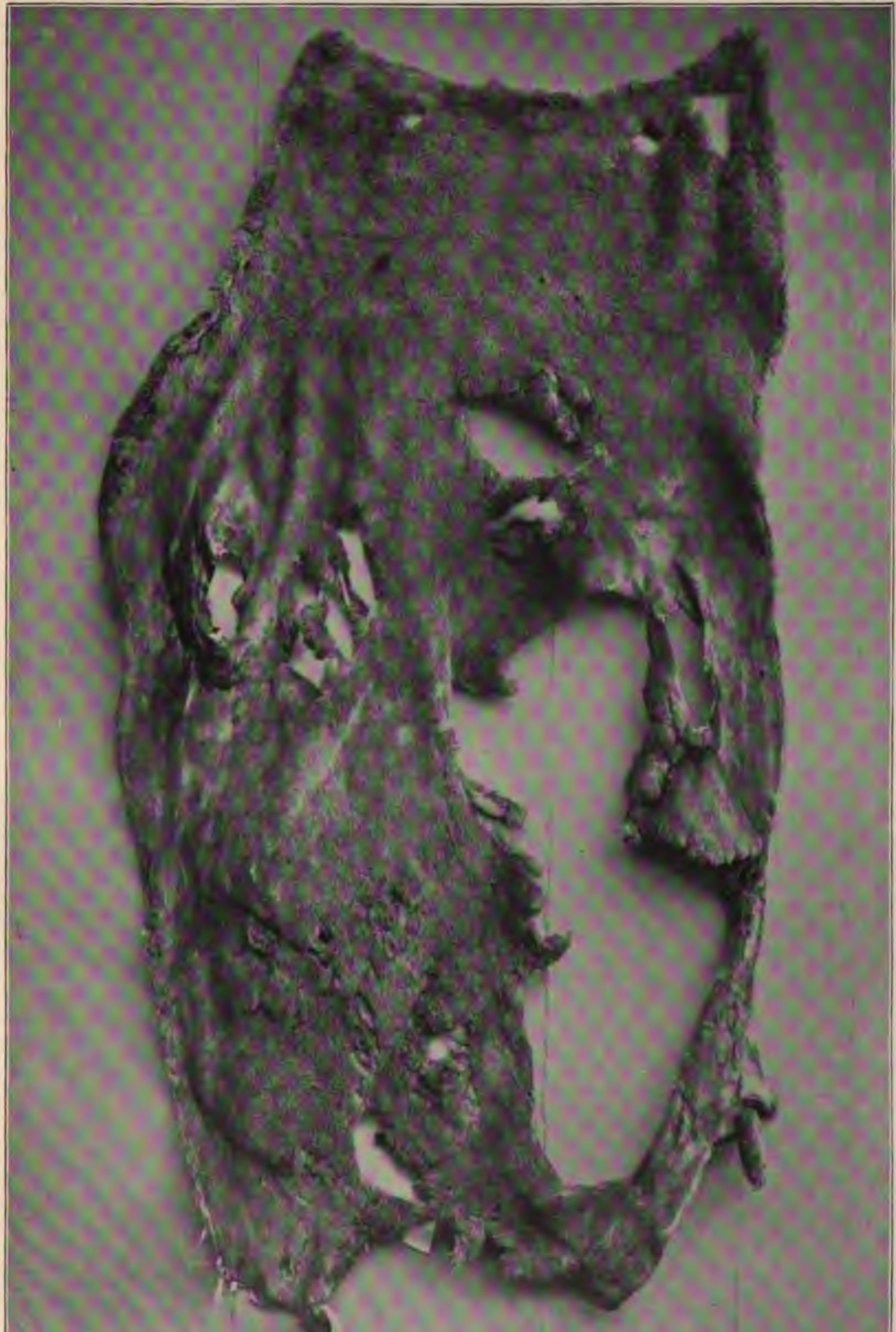
A ROOKERY COURTSHIP.

Drawn from nature by Bristow Adams.



AN ABDUCTED COW.

Drawn from nature by Bristow Adams.



THE SKIN OF A COW TORN AND BITTEN TO DEATH BY HER BULL ON LUKANIN ROOKERY, SAINT PAUL ISLAND, JULY, 1897.

elders. By twos they are striking for the foreflipper or dodging the blow, bracing and pushing and struggling with each other. They pant and strain, rest for a time, and then resume the contest.

This same thing is true of the little pups. As soon as they are able to play at anything it is bull fighting. The little black head of the 2-weeks-old pup strikes out for his neighbor's foreflipper, which involuntarily tucks itself under the body, and the little yellow teeth close on the fur of the neck and pull and tug until their owner has put to rout its antagonist or been routed. In each case, while it is plainly play, it is such dreadfully earnest play that one can only distinguish it from the fighting of the bulls by its results.

THE NOISE OF THE ROOKERIES.

To appreciate fully this picture of the animated life of the fur-seal rookery one must take into account the medley of sound that accompanies it. The bulls are giving vent at intervals to their savage roars of defiance. In their more subdued efforts to maintain discipline in the harem they are constantly whistling, chuckling, and scolding in various notes. Mingled with all this is the shrill bleat of the female and the answering call of the pup, which correspond to the voice of the sheep and the lamb, though greater in volume. When it is understood that thousands of these animals are calling and answering all the time, some idea of the uproar and confusion incident to rookery life is possible. Nor is the din and noise peculiar to the day. It can be heard at all hours of the night; in fact, the activity is, if anything, greater at that time.

THE SLEEPING OF THE SEALS.

In the early days of the breeding season all the animals sleep much of the time. The cows, as they come in from their long journey, spend most of the first ten days they are constantly on land in sleeping. It is with the height of the season, when the cows are landing in large numbers from their trips to the feeding grounds, that the noise and confusion becomes so marked. But even then through it all a large proportion of the animals are comfortably asleep. A harem may be seen in which, for the time being, every animal from the old bull down to the pups is sound asleep. Beside it may be a harem which is all confusion, every animal up and stirring, and most of them calling. Still another harem has part of its occupants awake and active, the rest asleep. On the hauling grounds, among the pups and among the idle bulls, it is the same.

The seals sleep very soundly at certain times. In counting the live pups it frequently happened that a pod of 50 or 100 pups would be driven over a space on which a half dozen or more pups slept undisturbed by the shuffling feet of their companions. To the seal's habit of sleeping soundly in the water the success of pelagic sealing is largely due. The pelagic sealer, taking advantage of the habit, is able to row close up to the sleeping animal and throw his spear into it or fill it with buckshot.

The attitude of the seal thus sleeping in the water is interesting. It lies on its back in a bowed position, the nose just peering above the surface, and, it is said, always to the leeward. The hind flippers are raised aloft as a windbreak to keep the animal in this definite position. In this attitude the seal can apparently sleep with the greatest comfort, rocked by the gentle swell. In such calm days as occur during the months of September and October the water off the rookery fronts and sand beaches is literally black with the swimming and sleeping pups. Occasionally older seals at this time, and more frequently earlier in the season, are to be seen in the same position.

THEIR ATTITUDES.

An interesting feature about the fur seal in its naps on the rookery is the variety of attitudes which it assumes. The sleeping animals assume every conceivable shape and position. One animal is stretched out at full length on its back, another on its side, still another on its stomach. Again, the hind flippers may be tucked up under the body, the foreflippers outstretched. These conditions may be exactly reversed. Or the hind flippers may be waving lazily in the air like a fan. On a day when the sun shines for a few minutes the seal lies prone upon the ground with its flippers in the air. The sight of thousands upon thousands of the animals thus stretched out, almost gasping for breath and with every hind flipper waving in the effort to keep cool, is a most interesting one.

The seals enjoy the rocks. They do not care for a smooth and even bed. The body has a wonderful power of adaptation to its rocky bed of water-worn bowlders. One cow finds a flat rock on which she curls up and lets her head hang over the side at a most reckless angle. Another lies with her head elevated upon a rock, as though on a pillow. A favorite position among the animals is to sleep sitting up with the head thrown back and the body wavering with the respirations as if it would fall. On rookeries where perpendicular cliffs form the back ground the animals are to be found stowed away on little shelves and in little angles where it is a wonder they can keep their positions at all.

THE COLORATION.

There is more or less diversity in the coloration of the various animals, which lends interest to the picture of rookery life. The little pups are at birth shiny black with a white spot in the axil. Some of them show a brownish shade along the throat and belly. In September they shed their black coats and don coats of gray, which, under the action of the weather, soon change into the brownish or combination brown and silvery color of the adults.

On her first landing the adult female is dark, slightly olivaceous, gray. Under exposure to the weather, and especially the sunshine, she turns to a rusty reddish brown, somewhat darker on the back, lighter on the throat and belly. The great uniformity of this coloration, as seen among the cows during June of 1897 before they had begun to go to sea, confirms the belief that these darker colors, as a rule, go with the older animals.

About the middle of July, the time at which the younger bachelors begin to appear in greatest number, the rookeries also show large numbers of animals which in their silvery throats and bellies contrast sharply with the animals already present. Their backs present the same dark-brown shade, but the silvery gray underneath the body is entirely different. Their small size, the black whiskers, and the lateness of their arrival proclaim them to be younger animals. But not all the younger animals are of this sort, as two virgin females killed side by side were each of a distinct type of coloration. This makes it possible only to say that the older seals are more uniform and darker in color, while among the younger seals there is more diversity. It seems likely that the lighter colors in the young seals correspond to the brownish bellied black pups. Among the bachelors the colors seem more uniform, though the younger males show again a preponderance of the lighter shades.

The greatest diversity exists among the bulls. Among the harem masters there are two general types, one almost black, the other reddish-brown. Both styles of coloration are associated with the older animals, but which is the older of the two is not apparent. The younger bulls are, as a rule, gray.

But these three are only general types. There is the greatest individual variation among the bulls of all classes, and almost any combination of shades or mingling of shades can be found. Much of the individual variation is due to the length of time the animals have been out of the water; in other words, to the influence of exposure. In the water and when wet there is but little difference in the coloration. In rainy weather the animals are all of one shade.

THE PELAGE.

The diversity of color in the fur seal is confined chiefly to the outer or water hairs, which project beyond the fur. The fur itself is fairly uniform. In the pups the water hair is glossy black at birth and is replaced in two to three months by hair of gray. In the females the water hair is more or less uniform in length, and the same is true of the males until after the third year. From this time on the hair on the neck of the male becomes longer and coarser, developing with the growth of the bull into stiff bristles, constituting the mane, or "wig," as it is called.

Beneath this water hair is the short, thick fur of the seal. In the preparation of the seal skins these hairs are carefully removed, leaving only the short, thick fur. It has been asserted that the pup is born without fur, having only the black hair, and that it does not attain its full pelage until the second year. This is not the case. The pup at birth has short fuzzy fur, which grows rapidly, and is of considerable length when the animal begins to swim. By the time it is ready for the sea in the fall its fur differs in length and thickness from that of the older seals only as the size of the animal varies.

THE STAGY SEASON.

Between the middle of August and the middle of October the adult animals shed their hair and get a new coat. During this season the skins of the seals are said to be stagy, and they are not taken on land. The fact, however, that one of the most important catches at sea is taken in August and September has led to some confusion. It has been held by those interested that no stagy seals were found at sea, and from this, by inference at least, it has been suggested that these animals are, for some reason, a different class.

In his report for 1896, the Canadian commissioner, Mr. Andrew Halkett, quotes the statements of a large number of sealers to the effect that they had never known a stagy seal at sea and had seen very few in poor condition as to fur. Mr. Halkett expresses his own opinion as follows:

> I have simply to say that nothing resembling a seal in poor condition, either as to hair or fur, was seen by me, although some 800 passed through my hands.

He adds the remark:

> I have no difficulty to decide as to a bird in a molting condition or in full breeding plumage, or a mammal when casting its hair, so that I cannot understand why it should be so difficult to tell a stagy seal.

The trouble here arises from a misunderstanding of what is meant by "staginess." It does not designate any marked difference in quantity of the fur. It has chiefly to do with the condition of the water hair. During the months of August, September, and October the water hairs are gradually replaced by a new growth. While this new hair is growing and before it has attained its full length it sticks tightly, and is very difficult to remove in unhairing the skin in the process of dressing.[1] The practical impossibility of removing all the short hairs depreciates the value of the skins. When the seals are taken on the islands in June and July the skins are approaching the time when these hairs are ready to fall out, and they are consequently more easily removed. As a large part of the value of the skin is the result of the labor put upon it in preparation, anything which tends to increase this labor decreases the value of the pelt in the raw state.

To the eye of the casual or untrained observer the skin of the seal taken in August or September does not show staginess. If the fur is parted, however, the short hair can be seen among the fur and hidden by it.

Under these conditions it is not strange that sealers and others do not recognize the seals as stagy. Staginess is a condition fully recognized and appreciated only by the furrier. In deference to his wishes, the seals on the islands are not taken while they are in this condition. As a result, for this reason among others, the island catch is regarded as superior to the catch taken at sea. The pelagic sealer does not respect the stagy season, and declares that he takes no stagy seals, but the price he obtains for his skins clearly indicates that the furrier does not agree with him.

THE ARRIVAL OF THE YOUNGER SEALS.

There remains yet to be recorded the arrival of the young 1 and 2 year old females. Their brothers, we found, arrive at the islands about the middle of July and spend their time on the hauling grounds. Whether the young females come with them to the vicinity of the islands or are associated with them on the migrations is not known. But they do not associate with them to any great extent on the islands.

The 2-year-olds come to the rookeries about the first of August. They take up their places in the old harems or in new and temporary ones in charge of young bulls on the water front and in the rear of the regular breeding grounds. Here they are served by the bulls and return to the water.

---

[1] The difficulties in the way of treating stagy skins are well put in the following extract from a letter by Mr. Isaac Liebes, of the firm of H. Liebes & Co., furriers, of San Francisco, Cal.:

"The short or water hair (in stagy skins) can never be entirely removed, and in attempting to do so a great deal of the wool is pulled out with the hair, which of course deteriorates the quality. Then again, the stumps of the hair being left in the leather (as they cannot be pulled out, but are cut off), makes the pelt stiff and harsh, so that after it is prepared the stagy skin can be clearly indicated by the color and texture of the leather. The water hairs can never be removed from the thin sides of the animal, where the fur is shorter than in the back, and in the process of machining, which these skins undergo, the wool is separated so as to expose the stiff hairs, which are then cut ont, but the sides, being so short in fur, the machine cannot successfully separate the hair from the wool."

The yearling females doubtless come to the islands in company with the 2-year olds, but do not put in an appearance on the rookeries much before September, at the time when the pups of the year are able to swim well and begin to make their first excursions about the islands. For the rest of the season these young seals spend their time playing among the pups and ranging like privileged characters over the rookeries.

That they do not, as has been supposed, frequent the hauling grounds with the males is doubtless due to the fact that these would annoy them, for the instinct of rounding up a harem and lording it over others is early developed in the young male. A young yearling male may frequently be seen rounding up a pod of sleeping or resting pups with all the gusto of an adult. The pups themselves not infrequently attempt the same thing with their fellows.

THE BREAKING UP OF THE BREEDING SEASON.

As has already been said, about the 25th of July the old harem bulls, that have fasted since the first of May, begin to leave and seek the feeding grounds. As they withdraw, their places are taken by the idle bulls. This class of males does not locate definitely on the breeding grounds much before the arrival of the cows. They have, therefore, fasted a shorter period and are able to remain out the season.

By the 5th to the 10th of August all the able-bodied adult bulls have gone, and the younger bulls, together with the bachelors, flock over the breeding grounds. The bachelors have, during the breeding season, been strictly excluded from the rookeries, but with the departure of the bulls they take advantage of their new freedom, and mingling with the cows and pups, they round up mimic harems and make themselves generally at home. In a few weeks, however, the novelty of the situation wears off, and the bachelors return to their favorite lounging places on the sand beaches.

THE CONDITION OF THE BULLS.

Much has been said of the wasted and broken condition of the harem masters as they leave the islands after their long fast. It is true that they become reduced in condition from their earlier state, but they are by no means so reduced or broken in spirit as they are reported. During the season of 1897, in counting the pups on the several rookeries it was necessary to enter them late in July or early in August and turn off the adults into the water. These so-called weak and emaciated bulls were found not only able but willing to fight us or one another to the last. In many cases they could not be moved at all any more than in the height of the season. This was at a time when these animals must many of them have been without food or water for at least two months. Our experience taught us that so long as an adult bull is on the breeding ground there is fight and courage enough in him to make him master of the situation; it is when the breeding season is over and he has removed to the sand beaches that he becomes tame and tractable.

The harem bulls on their first departure seek the feeding grounds and by the first of September return, some of them to their former places on the rookeries, where they plainly show their rejuvenation by their renewed combativeness, and also by their efforts to round up and monopolize such cows as still remain about. Most of them, however, haul out on the great beaches along North Shore, English Bay, and Lukanin, to sleep during the rest of the season, going to and coming from the feeding grounds as they feel like it.

THE FOOD AND FEEDING GROUNDS.

The feeding grounds of the fur seals in Bering Sea lie to the south and west of the Pribilof Islands, just off the 100-fathom curve, at a distance of from 100 to 200 miles. In the migrations the seals seem to follow in a general way this same curve

The food taken by the seals in Bering Sea consists mainly of squid, pollock, and a small smelt-like fish known only through the bones found in the stomachs of the seals. On the migrations along the coast squid is again the chief diet, though occasional salmon, herring, and rockfish are taken. This subject is more fully treated by Mr. Lucas in Part III.

THE AGE OF THE SEALS.

Of the age of the fur seals we know practically nothing, but one striking thing about the fur-seal rookeries is the absence of any animals which seem to be aged or decrepit. On certain sand beaches and out-of-the-way places animals in poor condition were seen, which at first glance seemed to correspond to the class of aged and infirm among other animals, but on dissection they were found without exception to show injuries which fully accounted for their condition. Some had dislocated joints, broken bones, injuries to the spine, buckshot wounds, and like troubles. None were suffering from old age.

Nor is this a thing to be wondered at. The severest strain which the fur seal undergoes is the winter migration in Bering Sea and the North Pacific. An animal weak or broken down from old age or injuries of one sort or another would succumb first to the hardships of the sea and would not return. To the breeding rookeries and hauling grounds are returned each spring only those animals which have possessed the hardihood and strength to survive the adverse conditions of the winter. These may be relied upon, unless overcome by accidents, to maintain themselves during the summer, to be again sifted out in the struggle for existence which the ensuing winter renews.

THE FUR-SEAL PUP.

Of all the different classes of animals the pups are the most conspicuous and interesting. For the first two months of their lives they are always present on the rookeries where they are born. Their black coats contrast sharply with the gray stones and with the brown fur of their mothers. For a few days after the pup is born it is watched over by the mother with a moderate show of interest, which manifests itself chiefly in supplying it with nourishment and keeping it out of the way of the clumsy bull. But before long the little fellow grows independent and leaves the family circle, seeking the lee of a sheltering rock at a distance from the harems. There it spends its time sleeping and playing with its companions. Whether this "podding" of the pups is a matter of choice or the outgrowth of the instinct of self-preservation, the result is good, for it keeps the little fellows out of the way of the fighting and trampling bulls. From the time when the pup joins the pod it receives no attention from the mother except on her return from the sea, when she feeds it. Her absences are at first brief, but as the pup grows older they lengthen out. The pup gorges itself with milk while the mother is on land and goes hungry until her return.

When it is about a month old the pup seeks the water's edge, and after paddling about for a time in the tide pools gradually learns to swim. This art, in which it becomes wonderfully expert, it finds evident difficulty in acquiring.

THE SWIMMING OF THE PUPS.

Many accounts have been given of the way in which various classes of animals are supposed to assist the pups in learning to swim. If these have any foundation whatever it arises from a misinterpretation of the fact that the young bachelors, and probably the yearling cows as well, play with and tease the pups in their first attempts to swim. Bachelors were thus often seen to shove the little pups off the rocks into the water, or even to attempt to catch and duck them. But the purpose was not to assist the pups.

What first starts the pup to the water is not clear, though why any other reason than the mere fact that it must eventually learn to swim and that the water is at hand, should be necessary, is not clear. It may be that the first pups seek the water following the example of the departing cows. But, once a single pup has made the experiment, every pup in its section of the rookery soon follows the example.

The pup seeks first the secluded and protected tide pools, of which numbers can be found along the rookery fronts. Here it paddles about, gradually seeking the open water, but keeping close to the shore. Its chief difficulty at the outset is to keep its disproportionately large head above water. In a very short time it becomes perfectly at home in the water and spends most of the daytime in it. As the pups are accustomed to play on shore, so they play in the water, rolling over and over each other, diving for shells, shaking strips of kelp, pieces of sticks, feathers, or anything that comes to hand, just as young dogs might.

THE EXCURSIONS OF THE PUPS.

By the middle of September, when the pups have learned to swim well, they suddenly develop a roving spirit and pass back and forth between neighboring rookeries, and there is a continuous band of pups coming and going between them. Thus, such a belt of pups was found in the early part of September to extend from Kitovi rookery past East Landing to Reef rookery, nearly a mile distant. Another followed around the cliffs back of the village connecting Gorbatch with Lagoon. Lagoon was in like manner connected with Tolstoi head, and a band of pups stretched on along the water front of English Bay, uniting Tolstoi and the Zapadnis.

At certain points intermediate between these terminals, the pups hauled out in groups of varying sizes and slept on the rocks, apparently remaining there for days and days at a time. But after the pups were branded on Kitovi rookery, observations on a pod of these pups hauled out under Black Bluff showed that while the number in these distant places remained nearly constant, the individuals came and went regularly. The pups doubtless returned to the rookery to meet their mothers, timing their visits with her return.

Toward the close of the month of September these excursions of the pups ceased as suddenly as they began, and the pups remained about their respective rookeries and in the waters adjacent to them, sleeping on shore when hungry, sleeping and playing in the water when full of milk.

MORTALITY AMONG THE SEALS.[1]

On the rookeries but a slight mortality occurs among the adult seals. A few of the cows are killed in various ways, chiefly in the struggles of the bulls for their possession. A total of 131 of these dead cows was found on the rookeries of the two islands last year. A score or more of bulls were found dead at the same time, evidently as a result of contests with one another. But this loss in a herd of nearly 160,000 adult animals is insignificant.

DEATH OF PUPS.

Among the pups the mortality is more striking. The average fur-seal pup after it is a few weeks old is not an easy animal to kill or injure. In our experience we have seen them stand hard knocks and even come from under the feet of the bulls uninjured. We have seen them tumble off and go bounding down the cliffs like rubber balls without apparent injury. But when the little pup is only a few days old it is a very different matter. In the rushes of the clumsy bull in his efforts to defend or discipline his harem a certain number of the little fellows are crushed to death before they are old enough to get away and pod by themselves.

THE PARASITE UNCINARIA.

In our investigations of the subject of mortality among the pups in 1896, which were begun late, we assumed that the chief cause of death among the 11,000 pups counted before the middle of August was the trampling of the fighting bulls. The more thorough investigations of 1897, however, prove this an error. The principal cause of death was found to be a small parasitic worm of the genus Uncinaria, which infests sandy areas where the seals are crowded and the ground has become filthy.

The embryos of the worm are taken in from the fur of the mother by the nursing pup and develop in the intestines, sucking the blood and causing the pup to die of anæmia. It is an infantile disease, and those which do not die before the middle of August outgrow it and survive. After that time these natural or accidental causes of death have but little effect on the pups, though, as we shall see later on, another and more serious cause of death presently begins, namely, the starvation of the young due to the loss of the mother at sea. For this man is solely responsible.

THE COUNT OF EARLY DEAD PUPS IN 1896.

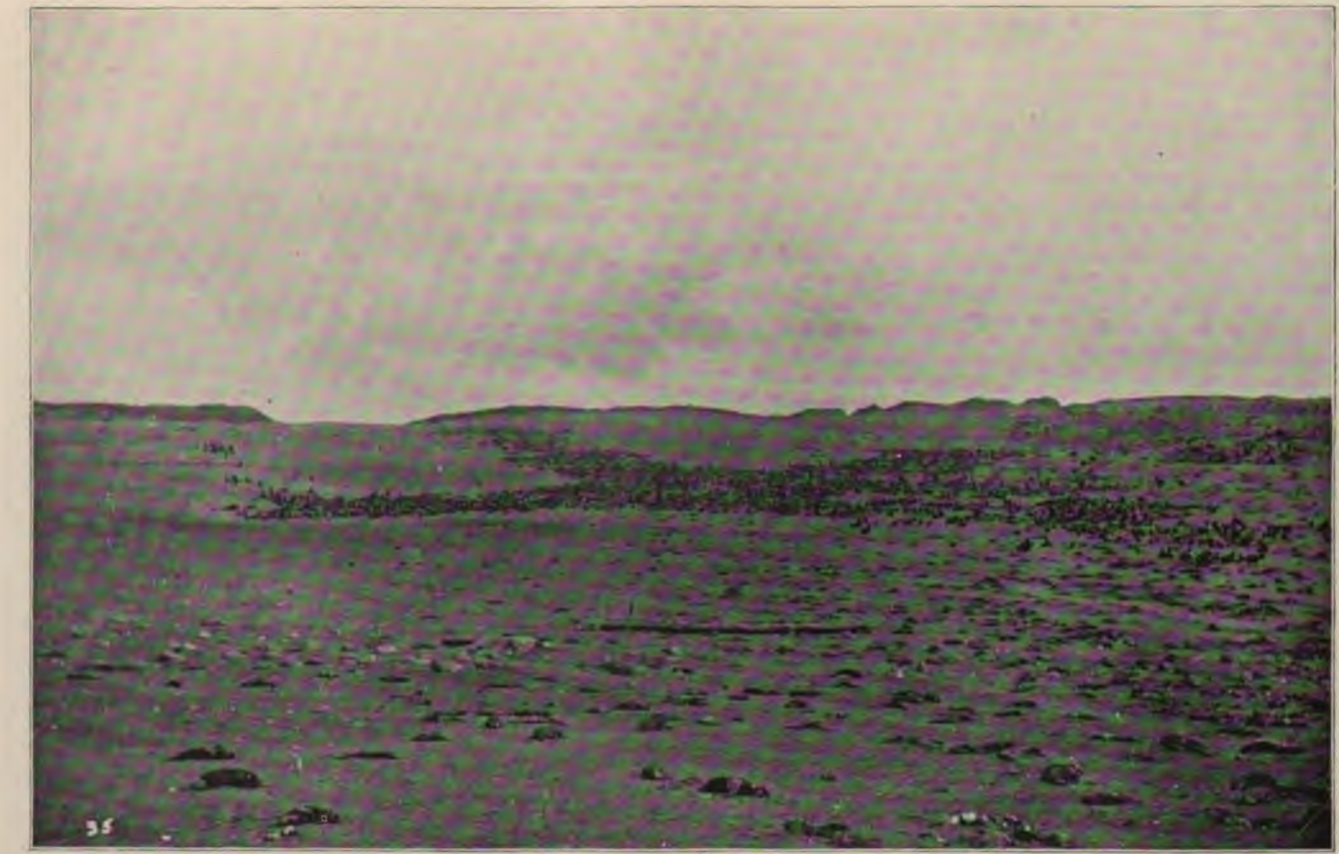
This early mortality among the pups was made the object of a careful enumeration in 1896. A full record of the count by rookeries will be found in the statistical appendix to this report. The following counts of the "death traps" where the injury of the worm was greatest will give some idea of its destructive effects:

Record of pups, 1896.

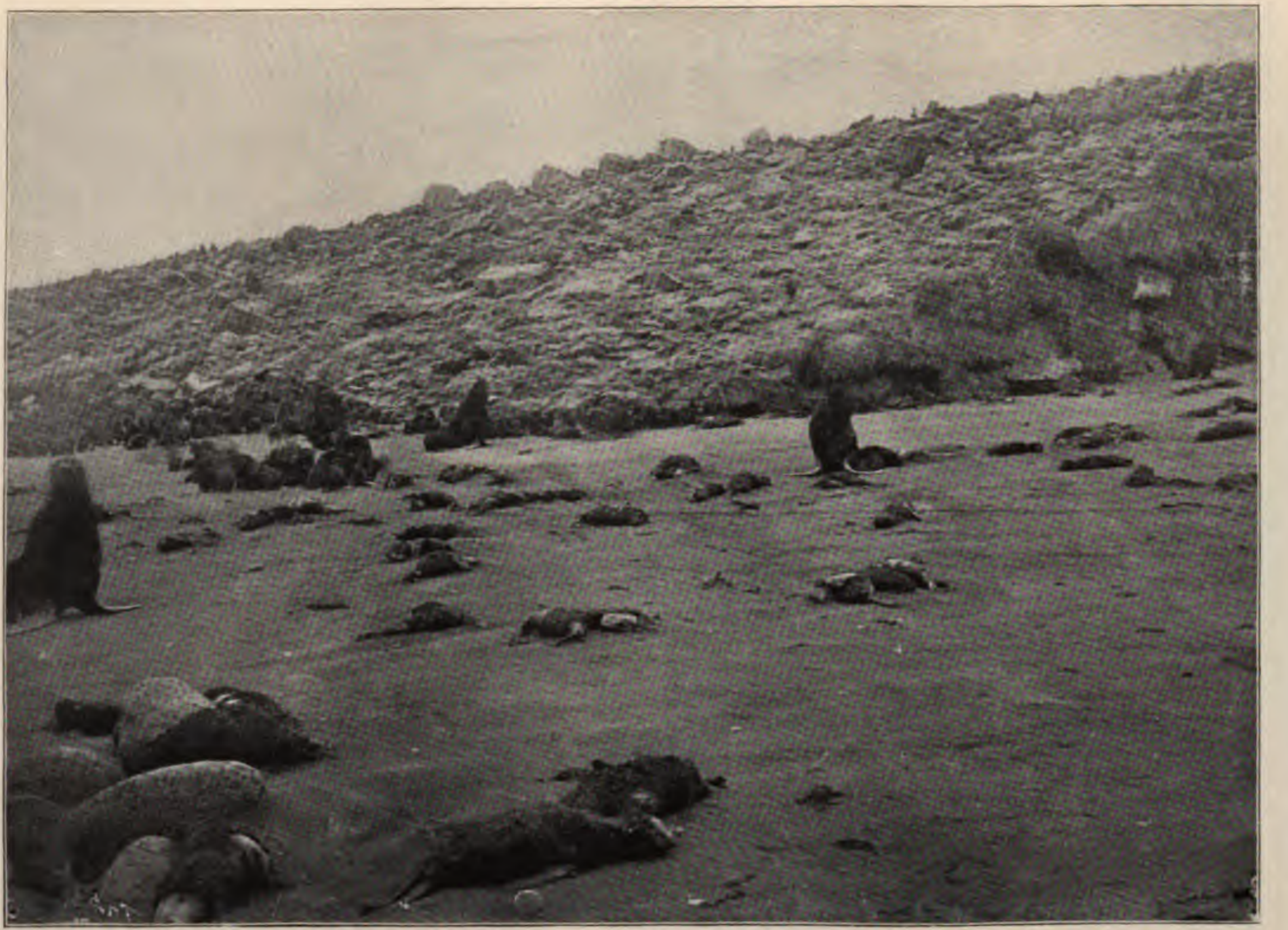
Rookery.	Pups born.	Pups dead (August).
Tolstoi (main, including sand flat)	11,775	1,495
Zapadni	17,648	3,095
Reef	15,258	950
Gorbatch	9,142	712

---

[1] This subject is more fully treated in a special paper by Mr. Lucas in Part III.



DEAD PUPS ON TOLSTOI IN 1891.
From a photograph taken by the British Commissioners.



A PORTION OF THE SAND PLAT OF THE TOLSTOI ROOKERY IN AUGUST, SHOWING PUPS DEAD FROM THE ATTACKS OF THE WORM *Uncinaria.*

Photograph by Townsend.

On the island of St. George a complete census of the dead pups for both seasons was made. This will illustrate the relative death rate on typical rookery ground from more or less accidental causes. The worm is practically absent from the rookeries of St. George, which are all located on bowlder beaches. On these rookeries there were born in 1896 about 19,000 pups; in 1897, 16,000. The following is the count of dead pups by rookeries:

Comparative counts of dead pups, St. George.

Rookery.	1896.	1897.
North	259	244
Little East	31	34
East	112	93
Zapadni	199	112
Staraya Artel	135	75
Total	736	558

THE DEPARTURE OF THE SEALS.

At the first approach of winter, usually in November, the cows and pups go away together. The pups are doubtless weaned at this time, as they nurse and subsist solely on their mothers' milk until the time of their departure. Following the example of their elders, they doubtless soon learn to subsist on fish. They have a hard time of it the first season by reason of the difficulty of securing food and because of the severity of the winter storms. It is pretty clearly ascertained that only about one-half return the second spring, and that not more than one-third of those born reach the age of 3 years.

THE ENEMIES OF THE SEAL.

What enemies the seals encounter on their migrations we do not know. Doubtless the greatest cause of destruction among them is the storms of winter, and these affect most strongly the old or injured and the young and inexperienced, which possibly fail to secure the requisite amount of food.

Much has been said about the ravages of certain species of sharks. It is not known that any shark preys upon them, in the north at least. The Great Killer (*Orca orca*) is a known source of loss about the islands. Whether the killers attack them in the open ocean or not is not known, though it is probable that they do not to any great extent.

THE GREAT KILLER.

Killers were seen in schools of from three to seven plying about the islands in the latter part of September, undoubtedly destroying many pups. These big fish swim into the bays, which fairly swarm with seals, old and young, at this time. Their course, as they move along the rookery fronts, is marked by hovering gulls, which alight to pick up the fragments. The seals seem absolutely stupid in presence of the danger.

On one occasion after a raid by these killers the carcass of a mangled cow was found washed up on Zoltoi Sands. On another occasion a killer in heavy surf followed the seals into Village Cove and became stranded on the rocks, but another heavy roller enabled it to get away before steps could be taken to kill it. One of its mangled victims, a large gray pup, was washed ashore, and an opportunity was thus given for its examination.

The killers are reported to visit the islands also in the spring at about the time of the landing of the cows, and a few were seen early in June in the spring of 1897. Whatever may be said of these animals, and the destruction they may cause, their feeding on the fur seals can not be considered as more than incidental, else they would remain about the islands all summer. They probably do not depend upon the seals in any way for food.

THE DEPARTURE OF BACHELORS AND BULLS.

The bachelors still linger about the islands after the departure of the cows. They are taken for food by the natives all through the month of December and at times far into January. On mild winters they are to be seen about the islands all winter. Thus, in the season of 1896–97, a food drive was made on December 14, and seals were reported on Sivutch Rock on December 30, January 7 and 29, February 6 and 16. Nineteen seals were killed for food on the rock on March 2.

But as a rule November closes the stay of the seals on the islands, and, class by class, they set out on their winter migrations.

THE SWIMMING OF THE SEALS.

The fur seal is wonderfully adapted for its long winter residence in the water. Its movements are as quick and graceful as those of a fish. In swimming it uses the fore flippers only. The hind flippers are held flat together, projecting backward like a rudder, and they may serve the animal in that capacity.

There are abrupt cliffs on St. Paul Island from which the motions of the swimming seals can be watched. A stone thrown near a submerged seal causes it to turn about and dart away with lightning speed. So rapid are its movements when thus disturbed that it is impossible to distinguish the motion of the flippers, which are powerful enough in the case of the bull to make the water boil in foam.

THE RATE OF TRAVEL.

In traveling rapidly the seal alternately rises clear of the water and dives under it in a series of compound curves. The dolphin-like leap, "breaching" as it is called, enables the animal without loss of time to recover its breath. How fast the seals can travel is not known and can probably not be computed. They have, however, been seen to follow and swim with apparent ease about vessels going at from 10 to 12 knots per hour. Under force of circumstances they could doubtless reach a higher rate of speed, but whether it could be continued through long distances can not be known.

Observations of the movements of a branded cow on Lukanin rookery in 1897 seemed to indicate that in her earliest absences she was gone from three to four days. As the feeding grounds in Bering Sea are upward of 100 miles distant from the islands some idea of the distance she must have traveled can be gained. She would doubtless spend some time on the feeding banks eating and resting. This trip the females make regularly throughout the summer at intervals of from five to ten or more days. Further evidence of the rapidity with which the seals travel can be seen in the fact that, though the females do not leave the islands much before the middle of November, they are taken off the coast of Southern California in December. Their trip down through the ocean must be rapid and more or less direct.

HABITS OF THE SOUTHERN FUR SEALS.

It may be worth our while to contrast with the foregoing account of the fur seal of the north some account of the life history of the fur seal of the Southern Hemisphere, the species of *Arctocephalus*, from the recorded observations of such early explorers and sealers as Delano, Fanning, Wedell, and Morrell. Dr. J. A. Allen has brought together in a paper, which appears in the Proceedings of the Paris Tribunal the important notes bearing upon this subject.[1] Without quoting in detail we may here give a brief summary of these observations.

THEIR MOVEMENTS.

The adult males land first in November, taking up their places on the rookeries and awaiting the arrival of the females, which come in December to bring forth their young. They come and go, caring for their young, until about the 1st of February, when the pups are left to shift for themselves.

In February the younger males or bachelors come on shore to shed their hair which is accomplished by about the 1st of May. This period corresponds to our stagy season. The bachelors then take to the water and do not return on shore much before the 1st of July. For a month or six weeks they come and go regularly, abandoning the shore at the end of this time until some time in August. For the rest of the season mixed herds, young males and females, occupy the shores, coming and going at intervals, until the old males begin to arrive in November. The young then retire.

This seems to be the round of life for the various classes as recorded. There is no lucid account of what becomes of the adult males and females after the offices of reproduction are accomplished. The bulls are reported as fasting from the time of their arrival until the breeding season is over, when they leave thin and lean, to return the following season plump and fat.

THEY DO NOT MIGRATE.

It is asserted that the seals do not migrate, though the record of observations seem to indicate that certain classes of the animals are absent from their breeding places for longer or shorter periods. While some of the animals are about the shores at all seasons, the evidence seems to show that they are of different classes and have different periods of movement.

BREEDING HABITS.

The offices of reproduction are accomplished on land. The female bears, as a rule, a single pup, though suggestions of the possibility of twins and even triplets are offered. The young are helpless at birth and learn to swim about a month afterwards. It is freely suggested that the mothers teach them. The pup at birth is covered with black hair. It gets its fur and changes its black hair for a coat of gray in a month or six weeks.

---

[1] Appendix U. S. Case, Fur Seal Arb., Vol. I, p. 375.

BREEDING GROUNDS.

The seals occupy for their breeding places narrow bowlder beaches at the foot of high cliffs and extend their harems into the crevasses and channels in the cliffs through which streams flow. In places their breeding grounds extend inland one or two hundred yards. The animals clamber over the rocks, reaching places inaccessible to man. They have good powers of locomotion, and the young walk on all fours.

In climatic conditions the home of the southern fur seals resembles that of the northern, though there is not the same marked difference between summer and winter. Doubtless there is no migration because no necessity for it. An average annual temperature of from 40° to 45° is recorded, which is about the summer climate of the Pribilof Islands. The sky is almost constantly overcast. Rain falls daily.

The fur seals of the south are gregarious and herd closely crowded on their rookery grounds, class by class. The young males are forced to withdraw by themselves in the breeding season.

THE FIGHTING OF THE BULLS.

The bulls struggle with one another for possession of the cows as they land. Each harem has from fifteen to twenty cows. These are jealously guarded and are not permitted to leave. The bulls fight valiantly against intrusion, whether by one of their own number or by man.

There is the same disparity between the males and females. The former is recorded as 6 to 7 feet long, the latter about 4, with a corresponding difference in weight.

They are found sleeping and playing in the water, just as the fur seals of the north are, and it is reported easy to approach and spear them.

DIFFERENCE IN TIME OF BIRTH.

It may be worthy to note in this connection that Capt. W. L. Noyes, who visited the Galapagos Islands during the summer of 1897, found cows with pups already born in July on Wenman Island, just north of the equator, whereas cows on other islands of the same group to the south of the equator, killed in September, contained pups still unborn and apparently not to be born until October or November. The seals of these islands are reported by others to bring forth their young at all seasons.

There is, however, no essential difference in the habits of the seals of the two hemispheres. The differences in date of the stagy season and of the breeding season are matters dependent upon the climate. The absence of migration periods so marked as in the case of the northern seals is due to the absence of such harsh conditions as the winter of the north exhibits.

CHAPTER VI.

THE CONDITION OF THE FUR-SEAL HERD.

A. PAST CONDITIONS.

We have given in the preceding sketch a brief description of the more prominent general features of the life history of the fur seal. This is only a brief summary of the record of daily observations made by the commission, and which is given in full in a subsequent part of this report. Many of these topics also are discussed in greater detail in special papers contained in Part III. We may now pass to a discussion of the main questions involved in the fur-seal controversy and made the principal object of this investigation. The first and chief of these relates to the condition of the fur-seal herd, past and present.

ACREAGE MEASUREMENTS.

Until the season of 1896 all estimates as to the number of seals have been based upon acreage measurements of one sort or another. In the early days, when the rookeries were teeming with seal life, it is probable that any other method of enumeration would have been exceedingly difficult, if not impossible. At any rate, no other method was tried.

We may say at the outset that acreage measurements of rookery population are exceedingly unsatisfactory. It is no easy task to find the area of a given rookery. Its length or sea front is easily ascertained, but its average width is at best purely a matter of conjecture. It spreads out over the level ground, shrinks away from a sand beach, climbs up hills in gullies, extends over cliffs, breaks at a cove to permit bachelors to land, thins out among rocks, and widens in great amphitheaters. Its lower boundary fluctuates with the tides; its inland extension grows daily with the arrival of late-coming cows, and the whole outline is changed in a few days as the bands of virgin 2-year-olds come into the ranks late in July.

THE DIFFICULTY OF ACCURATE RESULTS.

To measure a rookery, it is necessary to determine its boundaries from a distance in the breeding season, and after the departure of the seals to go on the ground and make the necessary measurements. It is impossible to approach the breeding mass in the height of the season near enough to locate landmarks by which the person making the measurements is to determine what he is doing. The best that can be done is to take the natural features available, a stone here or a break in the bank, or a log of driftwood there, and trust to being able to relocate them later on. The occupancy of the seals themselves leaves no permanent trace. Behind the rookeries for a considerable distance the ground has exactly the same appearance as that occupied by the seals, and late in the season the rookery population, where possible, moves back over its rear boundary, taking up a new position. Only natural landmarks can therefore be taken, and in a mile of rookery space the number of distinguishable marks of this sort is exceedingly small. Where stones exist, there are thousands of them practically indistinguishable. On bare slopes, as on Gorbatch, Vostochni, and Polovina, there are no natural landmarks whatever.

THE ABSENCE OF RELIABLE SURVEYS.

If perfectly recognizable artificial landmarks could be placed at every angle, turn, and projection of the belt of breeding seals, or if these points could be taken from a distance by instruments and then reproduced with certainty in the same manner after the animals have left the ground, accurate results might be obtained. Nothing of this kind, however, was done, at least no landmarks remain to show for it.

THE IRREGULAR NATURE OF THE GROUND.

But a determination of the rookery borders is not the only difficulty. The character of the ground is extremely variable. It lies at every conceivable angle and slant. There are narrow, rocky beaches hemmed in by perpendicular cliffs. There are long slopes of jagged bowlders. There are sand flats and cinder slopes. On the bare places the seals still mass together as closely as they can be crowded, and on the rocky areas they lie about among the rocks as best they can. Their distribution over the rookeries is as irregular as the nature of the ground.

It is in general true that the greater the number of females the more extended are the boundaries of the rookeries; but it is also true that with the decrease of the number of seals the population of the rookeries grows sparse without a corresponding decrease of dimensions. It is probable that when the seals were more numerous they were as evenly distributed over the ground as its nature would permit, and the greater part of each rookery was closely massed; but at the present time their distribution is very irregular, as unequal as the arrangement of the trees in the forest. On some of the rookeries, as on Tolstoi sands, in the breeding season the seals lie as thick as swarms of bees. On other rookeries, as the Lagoon, detached harems sprawl over the rocks and individual seals are greatly scattered. Nor are the mechanical imperfection of these estimates all. The counts of live pups made during the seasons of 1896 and 1897 show that at the time when these past estimates were made not more than half of the cows are present at any one time.

ACREAGE MEASUREMENTS CHIEFLY GUESSWORK.

In a word, the acreage measurements of the rookeries in the past have been based chiefly upon guesswork. More guessing has been done in determining the space to be assigned to individual animals, and finally the rookery population sought to be enumerated has at best represented only about half the actual number of animals belonging to the herd. The last element of uncertainty was not known until 1896, it having been assumed up to that time that during the period between the 10th and 20th of July all or practically all the animals belonging to the breeding herd were present upon the rookeries.

THE MAGNITUDE OF THE PROBLEM.

It is easy to find in the magnitude of the problem an explanation for the adoption of such a faulty method. It is not so easy to find an excuse for implicit reliance put upon its results. The parts of rookeries which can be counted to-day are so circumscribed by cliffs and the narrowness of the beaches that to make a count of them, even at the time of the greatest density of their population, would have been but little more difficult than it is to-day. More seals were present on a given area, but the area was no greater. The counting of these areas would of course not have relieved the difficulty as to a complete census; but a definite and exact enumeration, even of so small and accessible a breeding ground as Spilki, in 1874, could not have failed to clear up many of the problems which have tended to increase the confusion in past conditions.

EARLY ESTIMATES.

In considering the various estimates of earlier times, we purposely pass over that of Bishop Veniaminof. It is too vague and unsatisfactory to be of any value. It is, moreover, a prophecy of future results, based on assumed premises, rather than a measure of actual conditions. Furthermore, it was made at a time (about 1834) when, as we know, the herd had reached from some cause or other a state of approximate annihilation.

CAPTAIN BRYANT'S ESTIMATE.

After the islands came into the possession of the United States the first attempt to reach an estimate of the number of seals was made by Capt. Charles Bryant, agent of the Government, sent in 1869 to investigate the condition of the herd. Captain Bryant sums up his method of enumeration as follows:[1]

> There are at least 12 miles of shore line on the island of St. Paul occupied by the seals as breeding grounds, with the average width of 15 rods. There being about twenty seals to the square rod, gives 1,152,000 as the whole number of breeding males and females. Deducting one-tenth for males leaves 1,037,800 breeding females.

He estimates the number of seals on St. George at one-half the number on St. Paul. He further makes a rough estimate of the number of nonbreeding males, but he does not work it out or give a total. In comparing the estimate of Captain Bryant with the subsequent estimate of Mr. Elliott it must be noted that the young are not included.

THE FIRST ACREAGE ENUMERATION.

This estimate is crude both in its methods and in its results, but it certainly contains the germ of all subsequent acreage estimates of the seals. It was made and its results were published at least two years before the work of Mr. Elliott, which was begun in 1872. Whatever credit, therefore, belongs to the invention and execution of this method of arriving at the population of the rookeries must rest with Captain Bryant. His enumeration, though but a rough approximation, and probably so considered by him, brought for the first time the fur-seal herd within the range of a numerical estimate.

ELLIOTT'S ESTIMATE OF 1872-1874.

The next attempt at enumeration was made in 1872–1874 by Henry W. Elliott, special agent sent by the United States Treasury Department to investigate the condition of the herd. He followed the same general method inaugurated by Captain

---

[1] Bull. Mus. Comp. Zool., 1870, Vol. II, p. 106.

Bryant, finding the shore extent and width of the rookeries and allotting a certain space to each individual animal. He, however, worked out the plan in much greater detail.

IMPORTANT ASSUMPTIONS.

In Mr. Elliott's census two important assumptions are made at the outset. The first is that the time when the rookery population has reached its "exact margin of expansion, at the week of its greatest volume, or when the rookeries are as full as they are to be during the season, is between the 10th and 20th of July every year; not a day earlier and not many days later."[1] Mr. Elliott assumes as a result of this observation that at the period in question all, or practically all, of the animals were present and would be included in an enumeration made at that time.

THE LAW OF DISTRIBUTION.

He then assumed[2] "an imperative and instinctive law of distribution, recognized by each and every seal," in obedience to which "the breeding grounds occupied by them were invariably covered with seals in exact ratio, greater or less, as the area upon which they rested was larger or smaller;" that the seals "always covered the ground evenly, never crowding in at one place here to scatter out there;" that "on a rod of ground under the face of bluffs, which hem it in from the sea, there are just as many seals, no more nor less, as will be found on any other rod of rookery ground throughout the whole list, great or small."

BOTH ASSUMPTIONS INCORRECT.

One who is familiar with the nature of the breeding grounds can not help feeling that in the formulation of this law Mr. Elliott did not have the picture of the rookeries before him. Had he traveled over the length and breadth of the rookeries, as was done in 1896 and 1897, he never would have proposed such a law. That there should be as many seals to the square rod on the jagged and broken lava blocks of Kitovi, or on the broken slopes of Gorbatch, where the animals are now and must have then been separated by bowlders weighing tons, should be the same as on the smooth sand flat of Tolstoi or the level slope of Hutchinson Hill is on the face of it impossible.

THE TRUE LAW OF DISTRIBUTION.

The law of distribution which the fur seal obeys is very simple. The gregarious instinct of the animals leads them to crowd together as closely as possible. They are, therefore, even now to be found in as close proximity as the nature of the ground will permit. Where the ground is broken and interspersed with angular bowlders they are necessarily farther apart than where the ground is free from obstructions. It is probable that in Mr. Elliott's time the seals, because more numerous, were more evenly distributed, but the nature of the ground would never permit the same distribution everywhere.

STABILITY OF ROOKERY CONDITIONS ONLY APPARENT.

For the first assumption Mr. Elliott has some justification. During the period in question rookery conditions are to the eye of the observer apparently stable and fixed.

---

[1] Elliott, Monograph Fur-Seal Islands, 1881, p. 50.

[2] Ibid., p. 49.

That they were so was held as a tradition from Elliott's time down to 1896. It was, however, a great mistake to assume, as has been done, that at that time all the seals were present. Counts of live pups[1] made in the seasons of 1896 and 1897 show that at the height of the season not over half of the cows are actually present at any one time. The apparent stability of the rookeries is due to the fact that then the arrivals and departures among the cows for a time practically balance each other at their maximum point. But daily counts of the rookeries show that the stability is in no sense real, there being from day to day even then a variation of from 10 to 30 per cent in the rookery population.[2]

RESULTS OF MR. ELLIOTT'S ENUMERATION.

But of these things Mr. Elliott was not aware. He was content to assume that all the cows were there and, moreover, though he could not locate the virgin 2-year-olds, a class of animals numbering, in his estimate, 225,000, which were not present until long after it was made, he did not hesitate to assume that they were included. He was also content with his impossible law of distribution. It only remained for him, therefore, to find the area of breeding ground occupied and to divide it by the unit of space to be assigned to each individual animal, to arrive at the rookery population. As a result he found, in his estimate of 6,386,840 square feet of rookery ground on the two islands, "room," as he puts it, "for 3,193,420 breeding seals and young."[3]

THE FIGURES UNREASONABLE.

Waiving, for a moment, the method of obtaining these figures, we may remark that they are not easy to understand. Of this total of "breeding seals and young," Mr. Elliott, in the same connection, tells us that 1,000,000 are "young." There must then be an equal number of mothers, or 2,000,000 adult breeding females and their pups. To this must be added the young 2-year-old cows which are included, though not present. Mr. Elliott has himself given us an estimate of these. Considering that of the 1,000,000 pups born 500,000 are females, he says that "at least 225,000 of them safely return in the second season after birth." This, therefore, gives us a total of 2,225,000 females and young in the complete estimate of 3,193,420, leaving 868,420 animals which can only be accounted for as breeding bulls. This is impossible, and yet no other explanation of the discrepancy is at hand. Mr. Elliott estimates, in a separate category, all the nonbreeding males and the yearling females, finding 1,500,000 of them. Of the breeding bulls, as a class, Mr. Elliott does not give us a separate estimate in 1872, but in 1890 he tells us they numbered 90,000 at that time.

THE METHOD OF ENUMERATION FAULTY.

But if these figures were in themselves reasonable, we must still take exception to the method by which they were obtained. We have already spoken of the general difficulties in the way of acreage measurements. On his method of surveying the rookeries Mr. Elliott has given us practically no data. He dismisses the subject with the remark "that there is no more difficulty in surveying these margins than there is in drawing sight along the curbs of a stone fence surrounding a field," a statement which is not by any means self-evident to anyone who has visited the fur-seal rookeries. The surveys of the rookeries themselves can not be verified, for the conditions have changed with the reduction of the herd, and no permanent landmarks were left. Not even of the survey of 1890 is there left a single recognizable stake or stone to show that it ever existed. All that is left of either survey is the unsatisfactory estimate of the seals based upon it. These surveys should have formed the basis for subsequent comparisons of the condition of the rookeries. As such they would have been extremely valuable, but all traces of them have disappeared.

---

[1] See page 109. [2] See page 54. [3] Elliott, Monograph of Fur-Seal Islands, 1881, p. 61.

THE SURVEYS CAN NOT BE VERIFIED.

It is therefore not possible for us to verify Mr. Elliott's surveys of the rookeries, but his maps giving the shore line of the islands are available as a measure of his work as a surveyor. Of these maps Captain Moser, in his hydrographic report[1] on the islands in 1896, made certain tests. Of Mr. Elliott's shore line he says: "It was a bad misfit * * * and rarely stood the test of an instrumental angle." He further says of the topography of the maps that "it is so vague and indefinite that it is next thing to impossible to do anything with them; I should call them sketches." If this is true of the fixed and permanent shore line, it is not to be supposed that the changing rookery margins, which were necessarily noted from a distance in the summer and measured in winter, after they had melted away, were more correctly located.

THE EFFECT OF INACCURATE SURVEYS.

The correctness of the survey of the rookeries is of vital importance to the accuracy of this enumeration. This importance does not lie in ascertaining the mere length of a given rookery. This can be easily obtained, and in any event a mistake of a few feet or of a hundred feet in the length is comparatively insignificant; but the width of the rookery is another matter. To each one of seven of the ten rookeries of St. Paul Island, Mr. Elliott ascribes an even average width of 150 feet. Two of the remaining breeding grounds have a width of 100 feet each, and the third 40 feet. Therefore, for the 40,000 feet of rookery shore line on this island, 35,000 have an average width of 150 feet.[2] Suppose there is an error of but 1 foot in this average width, it is multiplied throughout the entire distance. According to the method of the computation involved this would mean the addition or subtraction of 17,500 animals, depending upon the side upon which the error falls. Again, suppose the average width was 140 or 160 feet, this would mean a difference of 175,000 seals one way or the other, as the case might be.

AN INADEQUATE UNIT OF SPACE.

But aside from the question of accuracy in the surveys themselves, Mr. Elliott has assigned an impossible space to each individual seal. His unit of space is 2 square feet to each animal, young or old, or 4 square feet for the cows, ignoring the pups. The average adult female is 4 feet long, and measures an equal distance from tip to tip of her outstretched fore-flippers. In a standing position she would need at least 3 square feet, but as the cows are constantly moving about, and coming and going to and from the sea, it is impossible to limit one to such a space.

---

[1] Hydrographic Notes, Captain Moser, Part III.

[2] Whatever the average width of each rookery may have been, it is certain that it was not the same for all. Neither now nor at any past time have Tolstoi, Polovina, Vostochni, the Reef, Kitovi, Lukanin, and Zapadni had the same "average width." The 150 feet is a guess, and that only.

A MORE RATIONAL UNIT OF SPACE.

During the past two seasons an effort was made to test the unit of space which the average seal occupies. A count of 650 closely crowded dead bodies on Polovina killing ground showed that each body occupied a space of 13½ square feet. The arrangement and proximity of these bodies corresponded very nearly to the condition of the massed rookery where the animals are stretched out sleeping. On Ardiguen rookery a harem containing thirty three sleeping cows and pups was observed on a flat space circumscribed by stones in such a way that its boundaries could be definitely located. Later in the season, when the seals had abandoned the spot, it was measured and found to give 8 square feet to each animal, old and young. This may be regarded as an example of extreme massing, as the animals could not have been packed closer together. The great sand flat of Tolstoi, the most densely massed rookery ground on the islands, was roughly measured late in the season of 1896 and found to contain about 140,000 square feet. Each of the 11,000 animals estimated for this area would therefore have a space of about 13 square feet. Messrs. True and Townsend, in 1895, found the average space for each individual adult seal in unmassed areas, as on Lagoon or Tolstoi cliffs, to be 46 square feet. For the massed areas a space one-half as great, or 23 square feet, was arbitrarily assumed.

It is true that Mr. Elliott justifies, in part, his small unit of space by certain references to the coming and going of the animals. He asserts that after the pups are born the individual cows are not on "their allotted space one-fourth of the time," and that the females "almost double their number on the rookery ground without expanding its original limits." But Mr. Elliott failed to grasp what this really meant. He sees in it only justification for the unit of space which he has assigned to the individual animals. It should have called his attention to the fact that the breeding seals which he saw before him, and which he was attempting to enumerate, were but a part and not the whole of the rookery population.

THE ESTIMATE FOR KITOVI AND LUKANIN ROOKERIES.

When we leave the general features of this estimate and come to consider its details we find still less reason to be satisfied with it. Of all the rookeries Kitovi and Lukanin have been most minutely studied and counted during the seasons of 1896 and 1897. Their present conditions are absolutely known. They may be taken as typical examples. To these two rookeries in 1874 Mr. Elliott ascribes a total population of 335,000 "breeding seals and young," or 158,000 breeding females, and, using his estimate of 15 cows to an average harem, 10,000 active bulls. At present there are 318 bulls, or less than one-thirtieth the former number, and 9,000 breeding females, less than one-seventeenth the former number.

To anyone who understands the situation of these rookeries this is simply absurd. It would be impossible to plat 10,000 harems on the space they occupy at present or which they occupied at any time past. Mr. Elliott's own maps show, when compared with present conditions, that no such reduction has occurred. His average width of 150 feet for these rookeries proves the same thing. With such figures nothing can be done. Mr. Elliott must have been wholly devoid of mathematical sense or else must have failed to appreciate what his figures really meant. No other hypothesis will account for them.

A MEASURE OF ELLIOTT'S OVERESTIMATE.

It happens that in the log of St. Paul are two references to these rookeries which throw light on their early condition and help us to penetrate the haze of exaggeration which Mr. Elliott has thrown about them.

Under date of May 24, 1880, Mr. J. W. Beaman, then agent on St. Paul, records in the log[1] of that island that he made "an inspection of Kitovi and Lukanin rookeries; 112 bulls were counted on Kitovi and 142 on Lukanin, with a possible error in the count of 25 to 50."

On the 24th of May by no means all of the bulls were in place, but a reasonable proportion of them may be supposed to have been. Mr. Elliott tells us himself that all the bulls were located by the 1st of June. This, however, the observations of the season of 1897 disprove. A count of North rookery of St. George on June 7 gave 180 bulls, where about 200 harems existed in 1896 and where 196 were found a month later in 1897. Even on the 12th of June a count of bulls on Kitovi rookery gave only 156, where 182 harems had been in 1896 and where later, in 1897, 179 harems were found.

THE COUNT OF MR. BEAMAN.

These recent counts justify us in assuming that a large proportion at least of the bulls were on the ground by the 24th of May, and although we can not say just what proportion the bulls counted by Mr. Beaman bore to the whole number on this rookery for the season of 1880, we may rest assured that had there been any such number as 10,000, or even 5,000, taking the average harem, which recent observations show to be correct, there would have been at least between 1,000 and 2,000 of them in place on that date.

Referring again to the log, we find that in 1879, the preceding season, bulls began to arrive on Lukanin rookery on May 2, and on May 17 there were 60 of them. This number is not greatly out of proportion to the 142 found a week later the following season, and argues still more strongly against the supposition that bulls by the thousand would occupy that rookery in June.

CAPTAIN BRYANT'S NOTE.

In this connection another note in the log of St. Paul Island has significance. In the fall of the year 1876 difficulty was experienced in securing the normal quota of pup seals for food. Captain Bryant, commenting on this, says: "Ordinarily Kitovi rookery alone would have supplied the necessary pups"[2]—four or five thousand. As only males were killed, and as a liberal allowance must be made on account of the swimming of the pups for the impossibility of reaching all the males, the inference plainly to be drawn from this is that at the time in question Kitovi rookery by a most liberal estimate had about 20,000 breeding cows. Mr. Elliott would have us believe it had nearly 160,000.

---

[1] Extracts from the log of St. Paul, Pt. II, date of May 24, 1880.

[2] Ibid., date of November 23, 1876.

SPILKI AND POLOVINA.

Two more examples may be cited in this connection. Mr. Elliott ascribes to Spilki rookery a population of 8,000 cows and pups in 1874 and something like 260 bulls. This was a small rookery under the hill behind the village of St. Paul, afterwards abandoned. It is recorded by Agent Beaman in the log for the year 1879[1] that this rookery on June 20 (a date at which all the harem bulls must have been in place) had 23 bulls. This is less than one-tenth of Mr. Elliott's estimate.

In the same year Mr. Beaman records, under date of June 10, that there were "a couple of thousand bulls" on Polovina rookeries, where Mr. Elliott estimates fully 10,000 in 1874.

While these entries do not give us definite proof as to the early condition of these rookeries, yet they clearly and conclusively show that Mr. Elliott's figures are grossly exaggerated.

PERSONAL ESTIMATES DIFFER.

To sum the whole matter up, we are unable to accept Mr. Elliott's estimate as representing anything more than an individual opinion greatly overdrawn by a too-vivid imagination. The value of individual opinions in matters of this kind is well shown by a comparison of the estimate of Mr. Elliott with that of Lieut. Washburn Maynard, who was on the islands in 1874, with him. Lieutenant Maynard estimates the total population of the rookeries at 6,000,000, as against Mr. Elliott's figures of 4,700,000. A difference of a million one way or another seemed to be a matter of no moment.

LOOSE USE OF FIGURES.

That Mr. Elliott himself did not originally attach close and definite meaning to his own estimate is evident from the discrepancy already referred to, whereby he assumes in his total of 3,193,420 "breeding seals and young" that only 1,000,000 are pups. Further, on the basis of this birthrate, which is an understatement of his own estimate, he finds that after making due allowance for an "extreme estimate of loss sustained at sea" there will still be left "180,000 seals in good condition that can safely be killed every year." The quota never exceeded 100,000, and the turning back annually of 80,000 young males to grow up as bulls would by 1880 have given the island a stock of approximately 800,000 bulls. This, of course, never occurred, for the simple reason that no such number of males in excess of the quota ever existed on the islands.

In making the above criticisms of Mr. Elliott's census, it has not been our purpose simply to tear down and condemn work which in many respects under the circumstances deserves commendation; but a disposition has of late been manifested to insist upon the absolute correctness of these figures, and in setting them aside it becomes necessary for us to give reasons for such action.

---

[1] Extracts from log of St. Paul, Pt. II, date of June 20, 1879.

MR. TINGLE'S ESTIMATE.

The next estimate of the seals was made in the year 1886 by Mr. George R. Tingle, then Treasury agent on St. Paul Island. Mr. Tingle purported to measure the breeding areas in the early spring when unoccupied, and then to compare them with the ground occupied in the summer to make the necessary corrections. He found a rookery space of 12,715,500 square feet, with a population of 6,357,750 breeding seals and young. Mr. Elliott's rookery space had been 6,386,840 square feet, with a population of 3,193,420 breeding seals and young. Mr. Tingle, however, took exception to the estimate of space assigned to the individual animals, believing it too small. He therefore reduced his estimate by one-fourth, or to 4,768,430, still an increase of 1,574,900 over Mr. Elliott's figures.

THE ESTIMATE INCORRECT.

The absurdity of this estimate makes it hardly worth considering. At the time it was made the herd was well on the way of decline. One element in the estimate may perhaps be cited as indicative of its value as a whole. The rocky beach at the foot of the cliffs, between the termination of Gorbatch rookery and the angle of Zoltoi sands, was made a separate rookery, with a population of 11,000 seals. The ground has never been occupied as breeding territory. Whatever may have been the purpose of this enumeration, it certainly did not give the facts in the case.

ELLIOTT'S 1890 ESTIMATE.

In the year 1890 Mr. Elliott again visited the fur-seal islands and made another estimate of their population. He employed the same methods used in 1872–1874. He found the seals occupying breeding territory to the extent of 1,918,786 square feet.[1] In his former estimate the ground occupied contained 6,386,840 square feet. Applying his original space unit to the area of 1890, Mr. Elliott found a population of 959,393 "breeding seals and young."

THE 1890 ESTIMATE UNSATISFACTORY.

For this second estimate we can only say that it is as bad, if not worse, than the first. All that we have said regarding the census of 1872–1874 applies with equal force to the census of 1890, for, as Mr. Elliott tells us, "it is made in precisely the same time and method." We may call attention specially to the fact that notwithstanding Lagoon rookery is found to be reduced from 37,000 animals to 9,000, the shore front of the rookery had been doubled in length, being 750 feet long in 1872–1874 and 1,500 in 1890. No explanation is offered or suggested for this extension. On the island of St. George, which has at the best only a limited extent of breeding territory, and this probably fully occupied in 1872–1874, Mr. Elliott in 1890 more than doubles the length of all its rookeries. On East rookery alone he expands the water front from 900 feet in 1872–1874 to 3,240 in 1890. As a result of this expansion he finds that though the seals have become reduced to one-fourth on St. Paul Island, on St. George the reduction has only been to one-half.

---

[1] Elliott's estimate for 1890 is 500,000 square feet less in extent than that of Messrs. True and Townsend for 1895. Dealing with the more accurate maps and when the herd was at least a half smaller, they found 2,616,063 square feet of rookery space as against his 1,918,786.

It is not possible for us to suggest any explanation or justification for the vagaries which these estimates of Mr. Elliott show, and they need not be further discussed here. In an appendix to the recent republication,[1] by order of Congress, of reports of agents and others connected with the fur-seal islands, they have been considered at length in connection with the subject-matter of the reports of which they are a part.

THE TRUE AND TOWNSEND ESTIMATE FOR 1895.

The most recent computation of the seals by acreage measurements is that made by Messrs. True and Townsend in 1895. In this a decided improvement was made in securing the space unit occupied by the individual seal. Instead of using an arbitrary estimate, a count of the cows was made on Kitovi and Lagoon rookeries and on parts of Lukanin and Tolstoi. The area of the counted districts was then taken from the current maps, and the average space occupied by the individual seals found. For the 4,110 cows counted, this average was found to be 46 square feet, ranging from 65 square feet on Lagoon rookery to 29 on Tolstoi. As the spaces counted were all of the scattered or "unmassed" sort, an arbitrary reduction to one-half of this space, or 23 square feet, was made for the crowded or "massed" breeding grounds.

Taking these averages and applying them to the acreage extent of the breeding grounds as obtained from the current maps of the rookeries, an estimate of the population of all the rookeries was arrived at. The total number so obtained was about 75,000 adult breeding seals. To make it comparable with the former estimates of Mr. Elliott we may add the 70,000 pups, making a total of 145,000 "breeding seals and young."

THE ESTIMATE MUST BE DOUBLED.

In this enumeration it was assumed that, at the time the census was made, all, or practically all, the animals were present, including the yearling and 2-year-old females. The effect of this assumption we have already alluded to in connection with Mr. Elliott's estimate. The fact is that at no time during the season are more than half the cows present. The estimate must therefore be doubled at least to make it represent actual conditions.

IT ANTICIPATED THE SEASON.

But as a matter of fact, for the estimate of 1895 this will not be sufficient. The counts on which the estimate is based were made before the real maximum of population on the rookeries was reached. The counting was done between the 8th and 10th of July, whereas the investigations of 1896 and 1897 show that the maximum of population is probably not reached until about the 15th of the month. Mr. Townsend himself, in referring to the estimate of 1895, remarks that "the rookeries may not have (as yet) reached their breeding height."

ARBITRARY REDUCTION FOR MASSED AREAS.

Another weakness in this estimate lies in the arbitrary reduction to one-half in obtaining the space for the massed rookeries. Our investigations on this point seem to indicate that the space unit for massed breeding grounds should be smaller. But for the underestimate which may therefore be involved on this account we can offer no correction. For the underestimate due to the early date at which the count was made we can make a rough estimate. The daily count on Lukanin rookery for the season of 1897 shows that between the 8th and 15th of July there was an increase of 15 per cent in rookery population. This would increase the figures for 1895 as originally given to about 80,000, and after doubling for absentees the corrected total would be about 160,000 breeding females. The inclusion of the yearlings and 2-year-old females does not affect the total, as they were not present, and no allowance need be made for them.

---

[1] "Seal and Salmon Fisheries, and General Resources of Alaska," vol. 3.

THE ESTIMATE REVISED.

This total of 160,000 females, or giving to each female a pup and adding the estimated number of breeding bulls, making 325,000 "breeding seals and young," is probably within 10,000 of the facts for the season of 1895. That it comes thus near the truth, however, is the result of accident rather than good management. The corrections which, in the light of subsequent experience, we have been able to make, are vital to its truth and change the results radically. The original results could not have been trusted alone, and were wholly misleading.

THE IMPORTANT FEATURE OF THE ESTIMATE.

The really important feature in the estimate of 1895 is the count of cows in which it originates. This was a distinct step in advance, in that it approached a rational basis. In the application of the unit of space to the rookeries not counted the method was unfortunate. The area of breeding ground was taken from maps in themselves imperfect, on which the rookery outlines were sketched by the aid of the eye. The rookery boundaries, as we have shown, are constantly changing as the season advances, and there being no definite landmarks to guide the observer, it is impossible that the outlines should be correctly located. The enumeration is therefore carried into the region of pure speculation and has only the value of the individual judgment of the person tracing the maps.

It is fair to say, however, that nothing definite and exact was claimed for the census of 1895, as Mr. True's own words, in commenting upon it, will show. He says: "I do not think that any estimate can be made which will approximate the truth more than remotely," and he continues to say that the chief use of such calculations is "the elimination of fanciful estimates of the number of seals."

MR. CROWLEY'S ESTIMATES FOR 1895.

In leaving the estimates of 1895 it is necessary to refer to two other calculations of rookery population made for the same year on a different basis. One of these is by Mr. J. B. Crowley, chief agent in charge of these islands. He finds, as he says, by actual count, a total of 99,936 breeding cows and 5,552 breeding bulls. When we make the necessary doubling of this estimate of cows and add the pups we have a total of about 305,552 "breeding seals and young." Of the methods or details of this enumeration we know nothing beyond Mr. Crowley's statement[1] that "the breeding seal herd has been reduced to such proportions that it can now be counted with comparative accuracy."

COLONEL MURRAY'S ESTIMATE.

The other calculation is one given by Colonel Joseph Murray.[2] He finds 5,000 bulls and 200,000 cows. Here again we have no details and only know that his method of enumeration was to count the breeding bulls and then to apply to each an average harem of 40 cows. This average size of harem is so large as to make it unnecessary to double for the absentee cows. We have, therefore, simply to add the necessary 200,000 pups and we have a total of 405,000 "breeding seals and young."

DEFECTS OF THIS ESTIMATE.

That Colonel Murray's count of bulls is more than a rough approximation its author has never claimed. That in greater part it is incorrect is clear from the fact that, while it was begun about July 18 it was not completed before August 21. Our investigations show that a count of harems after July 25 can give no idea of actual conditions. In examining the count, as given, moreover, our attention is attracted to the fact that on Lagoon rookery he finds only 50 harems, whereas Mr. True and Mr. Townsend, counting separately, found between 115 and 120 harems in the same season. While having manifestly suffered additional decline, it still had in 1897 115 harems. On the other hand, for a total of about 300 harems on Kitovi and Lukanin rookeries, counted by Messrs. True and Townsend, Colonel Murray records 500. These differences tend to show that the latter's count is made in round numbers, no account of anything less than 50 being taken.

CONTRAST OF ESTIMATES FOR 1895.

To give an idea of the nature of these various estimates for 1895, it is worth while to contrast them in tabular form:

Estimates, season of 1895.

	Bulls.	Cows.
True and Townsend	4,402	70,423
Mr. Crowley	5,552	99,936
Colonel Murray	5,000	200,000

It is not a gracious task to call attention to these widely variant and conflicting estimates put forward by authorized agents of the Government, and published simultaneously; but as they have been used by the British Commission to weaken the force of the more accurate and conclusive statistics of 1896, they must be shown in their true light as rough efforts at approximation, not corrected by other data.

CONTRAST OF ACREAGE MEASUREMENTS.

In leaving the subject of acreage measurements it will serve our purpose, as showing the unsatisfactory nature of the results thus obtained, to compare for a comment the various estimates that have been made on this basis. They are as follows:

---

[1] Sen. Doc. 137, Pt. I, p. 35.

[2] Sen. Doc. 137, Pt. I, p. 372.

Average estimates of fur seals, Pribilof Islands.

By whom made	Area.	Animals.	Remarks.
	Square feet		
Bryant (1869)	22,328,000	1,728,000	Breeding seals.
Elliott (1872-1874)	6,386,840	3,193,420	Breeding seals and young.
Tingle (1888)	12,715,500	4,766,430	Do.
Elliott (1890)	1,918,786	959,393	Do.
True and Townsend (1895)	2,616,063	70,423	Cows only, including one and two year olds.

SUMMARY OF PAST CONDITIONS.

To sum up this discussion of past conditions, we may conclude that the estimate of 1869 by Captain Bryant is only a rough approximation, and gives but little idea of the real condition of the herd. Mr. Elliott's estimate of 1872–1874 is scarcely less unsatisfactory, being, as we now know, nearly twice too great. His 1890 estimate, through the arbitrary curtailment of the breeding territory occupied, is nearer the truth, but still far from it. The estimate of Mr. Tingle is wholly untrustworthy. The estimate of Messrs. True and Townsend for 1895, when subjected to the obvious corrections and additions, which later observations show to be necessary, is very near the facts.

A RECONSTRUCTION OF EARLIER ESTIMATES.

In view of what has just been said, it becomes evident that the early estimates, made shortly after the herd came into the possession of the United States, can not be relied upon. There is abundant proof that the estimates are grossly exaggerated, but data is wanting to enable us to determine the real facts. Some estimate of these early conditions is, however, necessary, and no better method for obtaining it is available than a theoretical reconstruction of the herd on the basis of the present known condition of its breeding seals. To assist in this we have the record of the bachelor herd, as indicated in the history of the quota for the first twenty years of American control.

THE EARLIER AND LATER QUOTAS.

From 1871 to 1889, inclusive, the hauling grounds of the Pribilof Islands yielded 100,000 skins annually. The seals for the greater part of this period were obtained before the 20th of July. It is the testimony of those connected with the work that there were always killable seals left at the close of the season, and we know that the rookeries never lacked the necessary supply of male life.

During the present season a quota of slightly more than 20,000 seals was obtained after continuing the driving until the 10th of August and killing closer than ever before. In other words, at the present time the hauling grounds are not capable under like conditions of supplying one fifth the number of killable seals to-day that they were able without difficulty to furnish for 18 years prior to 1884.

THE QUOTA DEPENDENT UPON THE BREEDING HERD.

The bachelor herd is directly dependent upon the breeding herd. It is nominally taken from the surviving 3-year-old males and is directly related to the birthrate of three years prior to its taking. Three years ago, or in 1894, therefore, the birthrate of pups was between one-fifth and one-sixth of what it was in the period from 1871 to 1880. The breeding herds of the same years bear the same relation to each other. The present total of breeding females on the islands is about 130,000. We may infer, therefore, that in the period 1871–1880 there were about five times as many, or in the neighborhood of 600,000 breeding females.

ESTIMATE OF NONBREEDING SEALS.

Of the bachelors or nonbreeding seals no satisfactory estimate has been or can be made, but it is evident from the data now available that about one half the seals are lost in the first migration at sea, while the number is still further reduced to one-third, possibly to less, before the age of 3 years is reached. From this we can in a rough way calculate that in connection with the quota of 20,000 bachelors we have a total of approximately 400,000 animals, including breeding females, their young, and all other classes. This is a ratio of 20 to 1 between the entire herd and the herd of killable seals, and would, when applied to the herd of 1871–1880, give a total of about 2,000,000 animals of all classes.

THE RECONSTRUCTION STILL ONLY AN ESTIMATE.

In putting forward this reconstruction of past conditions we are well aware that it is still only an estimate. We have, however, in making it the advantage of definitely known premises to start from, and the results harmonize fully with the conditions of our problem.

COMPLETED ESTIMATE.

Assuming the figures we have arrived at, we find that they work out in harmony with the recorded facts of the quota for this period. Thus, with a birthrate of 600,000 pups, we may assume one-half, or 300,000, to survive to the age of 1 year, and 200,000 to the age of 3 years. One-half of these were males and were killed to fill the quota. We know, of course, that not all the surviving males were killed, and therefore that either the birthrate of pups was greater by 25,000 to 50,000 than the one assumed, or that the ratio of loss was slightly less than one-half and one-third. The computation is not intended to be exact, and can not be made so, but it is sufficient to show the direction in which the truth lies, and is conclusive enough to show that during the time of the herd's greatest expansion its breeding females numbered about 600,000, a figure sufficiently exact for all practical purposes.

Adding an equal number of pups annually and 20,000 breeding bulls, we have a total of 1,400,000 "breeding seals and young," for the period in which Mr. Elliott estimates 3,193,420.[1]

---

[1] We must insist that the calculations in the preceding paragraphs are intended merely as rough approximations to show the early condition of the herd. Such discrepancies as exist between these figures and those tentatively put forth in our Preliminary Report for 1896 are the result of more mature deliberation. The attempt of the British Colonial Office (see letter of Mr. Wingfield to Foreign Office, Corr. on Seal Fisheries, Brit. Blue Book, No. 4, September, 1897, p. 121) to make capita out of them is wholly unwarranted. The statements both here and in the former report are couched in sufficiently guarded language to leave no doubt in the mind of the candid reader. We merely wish to show that since the herd formerly yielded 100,000 skins annually and now yields but 20,000, it must once have been approximately five times as large as now. On the other hand we infer that it could not under the circumstances have been seven or ten times as large. These figures represent a attempt, more or less imperfect, owing to the complexity of the problem, to give concrete expressio to this undeniable fact.

B. THE PRESENT CONDITION OF THE HERD.

THE CENSUS.

In the work of the present investigation of the fur-seal herd the most important consideration was the making of as accurate an enumeration as possible of the number of animals. This has always formed an important part of every investigation in the past. But, as we have seen, the results have been anything but satisfactory. The great multitude of the animals, when the herd was five times as great as at present, may have left no other result possible. At the present time, even with the herd so greatly reduced, the task of making a complete census of all the rookeries is by no means an easy one, as the details of our work, which will be found in the Daily Journal, will indicate.

ITS DIFFICULTY.

Without going into detail here, we may mention among the difficulties of the problem the fringe of idle bulls, savage and immovable, that skirts each rookery, the danger of stampeding the rookeries themselves, the broken and irregular nature of the ground, and, finally, the constantly shifting nature of the rookery population. These are some of the merely mechanical difficulties. But more serious for us than any of these was the fact that at the outset the conditions of the problem before us were not at all understood. It had been currently accepted that during a period between the 10th and 20th of July the breeding rookeries were at their height and practically all the animals present. Upon this supposition all previous estimates had been based. With this idea in mind we began our work, only to find as we advanced that the supposition was unfounded.

For the smaller rookeries of St. George, and such rookeries as Kitovi, Lagoon, Zapadni Reef, and the cliff portions of Polovina and Tolstoi, it was found possible to make a count of the individual animals by harems. This was accordingly done. On the greater rookeries, as those of Northeast Point, Reef, and Zapadni, no count of individuals was possible, and for these rookeries only harems were enumerated.

ACTUAL COUNTS.

Our count of individual cows in 1896 covered about one-fifth of the rookery space on St. Paul Island, embracing 1,245 harems, with a total population of 16,679 cows, or an average of 13.4 cows to each harem at the height of the season. The average harem of the individual rookeries and parts of rookeries counted ranged from 11 in the lowest to 17.3 in the highest. The lower averages represented thin and scattered portions of rocky breeding ground, and none of the counted area contained any of the massed conditions characteristic of portions of the larger rookeries. The highest average belonged to Kitovi rookery, the largest continuous rookery space counted. It contained 3,152 cows in 182 harems, an average of 17.3 cows to the harem. The conditions of this rookery as a whole being more typical of the general conditions prevailing on the larger rookeries, its average was taken as a basis for computing the population of those rookeries on which only harems could be counted. The appropriateness of this average was the more apparent as on North rookery of St. George the 129 harems accurately counted gave an average of 17 cows to the harem.

KITOVI ROOKERY TAKEN AS TYPICAL.

Applying then the average of Kitovi to the rookeries of St. Paul on which individual counts could not be made, we obtained the following tentative census for this island:

Census of harems and cows, St. Paul.

Rookery.	Date of count.	Harems.	Cows.
Kitovi *a*	July 13	182	3, 152
Lukanin	July 20	147	2, 543
Lagoon *a*	July 13	120	1, 474
Tolstoi (main)	July 14	389	6, 729
Tolstoi (cliffs) *a*	July 14	108	1, 498
Zapadni	July 14	583	10, 085
Little Zapadni	July 14	210	2, 400
Zapadni Reef *a*	July 14	176	2, 256
Gorbatch	July 16	302	5, 224
Ardiguen *a*	July 16	27	550
Reef	July 16	504	8, 710
Sivutch Rock	Aug. 12	63	1, 090
Polovina (main)	July 23	138	2, 387
Polovina (cliffs) *a*	July 15	86	1, 268
Polovina (Little)	July 23	45	779
Vostochni *b*	July 16	975	15, 879
Morjovi *b*	July 16	293	4, 328
Total	....	4, 348	70, 361

a Cows and harems counted.
b Cows and harems counted in part only. All other rookeries were counted only by harems.

ORIGINAL COUNTS OF ST. GEORGE UNSATISFACTORY.

The rookeries of St. George had been counted on the 8th, 9th, and 11th of July before the counts on St. Paul were made. Later experiences led us to doubt the trustworthiness of these earlier counts, and, furthermore, the condition of the rookeries of St. Paul being different from that witnessed on St. George, it seemed likely that at the time of our first landing on the latter island, the season had not yet reached its height.

This view was strengthened by the fact that while the original count gave to St. George only one-tenth as many seals as were found on St. Paul, the former island had furnished more than one-fifth of the quota of killable seals. In the latter part of July we made a more careful count of bulls on Zapadni and North rookeries, which gave a much higher number of families than were shown on the original estimates. Finally, when live pups were counted on Little East Rookery, they were found to exceed the cows counted on the 9th of July by 4 to 1.

ESTIMATE FOR ST. GEORGE.

Having these matters in mind, in preparing the estimate for St. George Island last season, a compromise was reached in which all these elements had a share. This estimate was as follows:

Census of cows and harems, St. George.

Rookery.	Harems.	Cows.
North	225	3, 891
Little East	44	761
East	135	2, 335
Staraya Artel	75	1, 297
Zapadni	182	3, 148
Total	661	11, 432

THIS ESTIMATE ALSO UNSATISFACTORY.

In the light of our experience of the present season, however, this estimate for St. George still proves unsatisfactory. It was found that in the first hasty view of Little East rookery on July 9, 1896, a considerable portion of the breeding ground was hidden from view by the cliffs, because the most advantageous observation point was not selected. The proportion of killable seals furnished by St. George in 1896 proved wholly misleading because in 1897 the island furnished only one-ninth of the quota. The observations of the present season also show that a count of harems after the 25th of July gives no idea of the real condition of the rookeries at the height of the season. On rookery ground under inspection during 1897 for this purpose it was found that between the 13th and 25th of July, while the number of cows diminished one-third the number of families had been increased one-seventh through the ingress of young and idle bulls following the breaking up of the harem system.

But this information was not at hand when the census of 1896 was prepared on August 1, and the estimate seemed to represent as nearly as possible the actual condition of the breeding herd at the time known as the height of the season.

THE GREAT EXCESS OF PUPS.

As our observations on St. Paul continued, and especially when we came to enter the rookeries to count the dead pups, our attention was attracted to the fact that the pups seemed to be much more numerous than the estimates of cows in the height of the season would warrant. This was particularly noticeable on the sand flat of Tolstoi.

To test the matter a careful count of the live pups on Kitovi rookery was made on August 15. This rookery had been taken as the typical one in making up the census and the most accurate count of cows was made upon it. A total of 5,940 live pups were found. To this number 109 dead pups counted a week before were to be added, making a total of 6,049 pups for a rookery where 3,152 cows had been counted on the 13th of July at the supposed maximum of its expansion.

COUNT OF PUPS.

The counting of live pups was continued on all parts of rookeries where cows had originally been counted. In some cases the counts could not be made accurately because the pups were beginning to swim well and took to the water. Where the counts were most satisfactory the proportion of live pups to cows was about 1.90 to 1. The proportion on Kitovi was 1.91, and here the count was made under favorable conditions because a heavy surf kept the pups from going to sea. Where the lowest percentages were found the least accurate counts had been made.

The following is a detailed statement of the count of live pups:

Count of live pups, 1896, St. Paul Island.

Rookery.	Cows.	Pups.
Kitovi	3, 152	6, 049
Tolstoi (cliffs)	1, 498	2, 664
Zapadni Reef	2, 256	3, 862
Lagoon	1, 474	2, 484
Polovina (cliffs)	1, 268	2, 496
Vostochni (part)	2, 887	4, 412
Morjovi (part)	1, 194	2. 289
Total	13, 729	24, 256

CORRECTION FOR ABSENT COWS.

Averaging the various counts it seemed that the proportion of live pups to the apparent number of cows present in the breeding season was 1.75. Our experience during the season of 1897 shows that this was too low, and that it would have been better had the simple conditions of Kitovi rookery been taken as typical of the other rookeries, using its proportion of 1.91 to 1.

On the basis of our count of live pups the previous census was corrected by the addition of 75 per cent to allow for absent cows in the height of the season. In this way the completed preliminary census put forward in 1896 was made. It is as follows:

Summary of breeding seals (counts and estimates) 1896.

Rookery.	Harems.	Cows (count).	Actual total.
ST. PAUL.			
Kitovi	182	3, 152	6, 049
Lukanin	147	2, 543	4, 450
Lagoon	120	1, 474	2, 484
Tolstoi (main)	389	6, 729	11, 775
Tolstoi (cliffs)	108	1, 498	2, 664
Zapadni	583	10, 085	17, 648
Little Zapadni	210	2, 400	4, 200
Zapadni Reef	176	2, 256	3, 862
Gorbatch	302	5, 224	9, 142
Ardiguen	27	550	652
Reef	504	8, 719	15, 258
Sivutch Rock	63	1, 090	1, 907
Polovina (main)	138	2, 387	4, 177
Polovina (cliffs)	86	1, 268	2, 496
Polovina (little)	45	779	1, 363
Vostochni	975	15, 879	27, 148
Morjovi	293	4, 328	7, 773
Total	4, 348	70, 361	123, 048
ST. GEORGE.			
North	225	3, 891	6, 809
Little east	44	761	1, 350
East	135	2, 335	4, 086
Zapadni	182	3, 148	5, 509
Staraya Artel	75	1, 297	2, 269
Total	661	11, 432	20, 023
Grand total	5, 009	81, 793	143, 071

Bobrovi (Otter Island) had 1 harem, containing 5 cows and 5 pups.

REVISION OF CENSUS OF 1896.

As already intimated, the estimate for St. George Island for 1896 is not satisfactory. That Little East rookery was considerably underestimated is evident from a closer inspection of this breeding ground during the season of 1897. The original count gave only 27 harems, but probably included no more than two-thirds of the rookery. As there were but few idle bulls about this rookery, the count of bulls made late in July can not be far out of the way here, and in the absence of a better estimate it may be allowed to stand.

CORRECTIONS ON ST. GEORGE.

On Zapadni and North rookeries, however, the number of harems counted in the latter part of July can not be accurate. When the rigid harem system breaks up and the original harem masters begin to leave, the idle bulls (of which there were many about these rookeries) enter the breeding grounds, increasing the number of families, though the actual population has been diminished by the more frequent and prolonged absence of the cows. The number of bulls therefore found for those two rookeries on July 31 can not be accepted as representing the number of families in the breeding season and must be reduced.

CORRECTIONS ON ST. PAUL.

The need for revision in the census of St. Paul Island is not so great; but our experience during the past season shows that in all probability the harems on Zapadni and Tolstoi rookeries were slightly overestimated and those on the main part of Polovina underestimated.

Zapadni rookery occupies a long gradual slope back of the more abrupt bowlder beach. This slope was filled with savage bulls, making close approach in 1896 impossible. The count of harems was made from a boat offshore and was not corrected by a count from behind. From this point of view of the water the whole field could not be inspected, and the figures of last year were felt to be merely a rough approximation. The estimate for those not clearly seen was certainly too large. This year the rookery had shrunk so largely that observation points from the rear, commanding the entire breeding ground, could be reached. In like manner the estimate of Tolstoi for 1896 was made under difficulties, which were more satisfactorily overcome in 1897.

On Polovina the conditions were similar to those on Zapadni. The main part of the rookery lies on a gradual even slope, behind which the idle bulls were collected in such numbers as to prevent near approach, while there was no opportunity to inspect the rookery from the water. This year the conditions were so changed as to permit of much closer inspection, and although the mass of breeding seals had plainly shrunk at every point, practically the same number of harems were counted, making an addition of harems necessary.

SIVUTCH ROCK.

A third correction must be made in the estimate of Sivutch Rock. The original estimate of this rookery was made after an inspection of the rock with a field glass from the plateau of the Reef, which showed 27 bulls in charge of harems on the northern face. At the time of the count of dead pups in August a landing was effected and an attempt made to estimate the number of harems, as the rookery seemed plainly greater than our original estimate allowed for. Sixty-seven bulls occupying harems were then found, though it was plain that the rookery was wholly disorganized. This season Sivutch Rock was inspected from all sides in a boat at the height of the season and an adequate notion of the extent of the rookery obtained. Harems were found on the southern side and in places where their presence was not suspected in 1896. The total number counted in 1897 was 102. It is therefore necessary to largely increase the original estimate for this rookery.

In balancing these under and over estimates, however, they practically neutralize each other and leave the total for St. Paul for 1896 about what it was. For St. George Island also the difference resulting from the revision is not great, being only about 600 cows.

THE IMPORTANT CORRECTION IN THE CENSUS OF 1896.

But the chief error in the census of 1896, and this applies to both islands, lies in the percentage of correction to be added for absent cows. This has already been referred to. Instead of the average correction of 75 per cent, one of 100 per cent would have been more nearly correct. However, since in the original census of 1896 and in the census of 1897 Kitovi rookery has been taken as typical of the rookeries as a whole, we may use its percentage of correction, 91, in the revision. After making this correction and such alterations in the estimates of harems as experience shows to be advisable, we have the following revised and completed census for the season of 1896:

Revised census, 1896.

ST. PAUL.

Rookery.	Harems.	Pups (cows).
Kitovi	182	6,049
Lagoon	120	2,484
Polovina (cliffs)	86	2,496
Zapadni Reef	176	3,862
Lukanin	147	4,880
Tolstoi[1]	467	15,504
Zapadni[2]	543	18,027
Little Zapadni	210	4,584
Gorbatch	302	10,026
Ardiguen	27	[3]896
Reef	504	16,732
Sivutch[4]	105	3,486
Polovina[5]	153	5,079
Little Polovina	45	1,494
Vostochni	975	32,370
Morjovi	293	9,727
Total	4,335	137,696

ST. GEORGE.

North[6]	200	6,640
Little East	44	1,350
East	135	4,482
Zapadni[7]	143	4,747
Staraya Artel	75	2,490
Total	597	19,709

RECAPITULATION.

St. Paul	4,335	137,696
St. George	597	19,709
Grand total	4,932	157,405

[1] A reduction of 30 harems from the original estimate.

[2] A reduction of 40 harems.

[3] The original count of 650 pups used in the census of 1896 was made from the cliffs above the rookery under circumstances which make it certain that it is an underestimate It is therefore discarded.

[4] An increase of 42 harems.

[5] An increase of 15 harems.

[6] A decrease of 25 harems.

[7] A decrease of 39 harems.

THE VALUE OF THIS CENSUS.

This elaborated and corrected census of 1896 gives our best possible judgment as to the conditions on the rookeries of St. Paul and St. George during the season of 1896. The revision and alteration which have been found necessary make the estimate more or less unsatisfactory. But no other result could be expected. The census was a growth and an experiment from the start. The conditions under which it ought to have been made were not understood until the time was passed. Notwithstanding all this the total results as here given are close enough to the actual conditions for all practical purposes. The total of 157,405 breeding seals means between 150,000 and 160,000. No closer accuracy is claimed for the figures, and none is needed. The margin of error can not be greater than this.

THE CENSUS OF 1897.

In making the census of 1897 no such difficulty as that encountered in 1896 was met with. From the start we had a clear idea of the problem and were guided by the experience obtained in the work of the former season. The first thing to be done was to make a full enumeration of the breeding harems on all the rookeries at the height of the season. The remaining step was to obtain an average size of harem by making a count of live pups on some typical rookery space. Accordingly between the period of July 13 and 20 the count of harems was made. For purposes of comparison the cows actually present on rookeries counted last year were recounted this year on the same dates.

THE COUNT OF PUPS IN 1897.

The count of pups was made between the 28th of July and the 3d of August. A comparison of the number of pups with the number of cows counted showed clearly the inadequacy of our correction of 75 per cent for absent cows in the original census of 1896. These counts of cows and pups for 1897 are as follows:

Comparison of counts of cows and pups, 1897.

Rookery.	Cows present.	Pups.
Kitovi	2,436	5,289
Lagoon	1,319	2,598
Zapadni Reef	1,049	3,041
Polovina (cliffs)	747	2,200
Ardiguen	470	736
Little East	497	1,190
Total	6,518	15,054

THE PROPORTION OF COWS TO PUPS.

These counts seem to show that the cows belonging to any rookery for the season are about 2.61 times as numerous as the cows found present at any one time in the height of the season. But an examination of the figures for Zapadni Reef and for Polovina cliffs indicates an abnormal condition of things on these rookeries. In both cases the pups outnumber the cows nearly three to one. It would seem likely that the weather or some other cause had on these rookeries produced an unusual effect for the day when the counts were made.

In view of this apparently abnormal condition in part of the rookeries counted, it has been thought best in the census of 1897 to waive the general average results and take the simple conditions of Kitovi rookery as again typical. We find from a comparison of this rookery for the two seasons that its condition is apparently normal. In 1896 there were 182 harems, 3,152 cows present on July 13, in the height of the season, and 6,049 pups in August; in 1897 there were 179 harems, 2,436 cows actually present on the same date, and 5,289 pups in August.

THE AVERAGE HAREM OF KITOVI.

Dividing this total of 5,289 by 179, the number of harems, we find the average harem of Kitovi rookery to contain 29.5 cows. This harem is applied to all the rookeries on which only counts of harems were made. Where pups were counted, the figures so obtained are used without change. The only difference in the method of computing the census of 1897 from that of 1896 is in the dropping out of the intermediate step of completing the provisional census of cows and afterwards adding the necessary correction for absentees. This step, now that the conditions are known, becomes superfluous. Constructed on this basis the following is the completed census of breeding seals for the two islands for the season of 1897:

Census, 1897.

ST. PAUL.

Rookery.	Harems.	Pups (cows).
Kitovi	179	5, 289
Lagoon	115	2, 598
Polovina (cliffs)	61	2, 200
Zapadni Reef	114	3, 041
Lukanin	139	4, 100
Tolstoi	393	11, 593
Zapadni	458	13, 511
Little Zapadni	176	5, 192
Gorbatch	308	9, 086
Ardiguen	33	736
Reef	454	13, 393
Sivutch	102	3, 009
Polovina	143	4, 218
Little Polovina	40	1, 180
Vostochni	910	26, 845
Morjovi	233	6, 873
Total	3, 858	112, 864

ST. GEORGE.

North	196	5, 782
Little East	46	1, 190
East	128	3, 776
Zapadni	133	3, 923
Starie Artel	57	1, 681
Total	560	16, 352

RECAPITULATION.

St. Paul	3, 858	112, 864
St. George	560	16, 352
Total	4, 418	129, 216

THE VALUE OF THE CENSUS FOR 1897.

Whatever doubt or uncertainty may exist regarding the census of 1896 there is none with regard to that for 1897. No estimates were made. The count of harems was complete for every rookery. The count of pups was carefully and accurately made. While not claiming infallibility for these figures, the margin of error is slight.

From this census we have therefore a total of 4,418 breeding bulls and 129,216 breeding cows for the season of 1897. Each of these cows bore a pup during the season. There were therefore a total of 262,850 "breeding seals and young" at one time or another on the rookeries of the Pribilof Islands during the past season.

Thus far our census of the fur seals can lay claim to accuracy, but it does not cover all classes of animals, and when we attempt to extend it beyond the breeding herd to include idle bulls, bachelors, and yearling and 2-year-old females, we must leave facts and begin to theorize.

THE ENUMERATION OF NONBREEDING SEALS.

During the season of 18 6 a rough approximation was made of the class of males known as idle bulls. The number found in close proximity to the breeding grounds was estimated at about 3,000. No attempt was made to include animals located on various sand beaches and such hauling grounds as those of Sivutch Rock, Zapadni Head, Lagoon, etc. The enumeration of this class of bulls was therefore only partial at best. On certain rookeries where they were counted last year, counts were made this year for comparison, but beyond this nothing was done or could be done. Only a general estimate of idle bulls can therefore be given, but the number would seem to be not far from 5,000, or in round numbers, a number equal to those occupied.

IDLE AND HALF BULLS.

In addition to these idle bulls the hauling grounds and the water front were full of young half bulls, 5 and 6 years of age, which had not yet even attempted to secure places on the rookeries. From the killing grounds during the present season 8,000 of these animals were turned back from the drives. As some of the young bulls may have been driven two, three, and even four times from the same hauling ground, this number can not be taken at its face value. But in corners of many of the hauling grounds, in the runways on the Reef and in the various ravines on Zapadni, large numbers of these animals were not disturbed at all, while the water front of all the rookeries was lined with them. A fair estimate of the young bulls would not fall far short of 10,000. This class represents chiefly the natural reserve which has accumulated from the escape of the animals of killable age since 1893. The idle bulls as a class and the oldest of the half bulls are the aftermath of the modus vivendi.

THE BACHELORS.

But these animals are not numerous and their record is not important. It is concerning the bachelors below killable age and the cows below breeding age that we ought to have exact information, but can not get it. It is impossible to count the yearling and 2-year-old bachelors. They do not arrive at the islands until late in the season. They occupy their hauling grounds very irregularly, coming and going from the water according to pleasure and the state of the weather.

REJECTED SEALS.

From the killing grounds during the present season 15,000 animals too small to kill were turned back. As in case of the young bulls, some of these, perhaps many, were driven and redriven; several drives being made from each hauling ground during the season. The actual number represented by this total of rejected animals can not be exactly determined. From this it would seem necessary to suppose that by no means all the younger seals appear on the hauling grounds during the killing season. In fact the records of the drives show that it is only after the middle of July that the yearlings begin to arrive in numbers. The older bachelors appear earliest, and by the time the killing season is over the great majority of the killable seals are secured, leaving the population of the hauling grounds almost exclusively yearlings and 2-year-olds.

THE 1 AND 2-YEAR-OLD FEMALES.

What has been said about the 1 and 2-year-old bachelors applies equally well to the same class of females. These do not appear on the islands before the 1st of August. The 2-year-olds come on the breeding grounds and are scattered about among the harems, spending a few days and leaving. They come and go at intervals during the rest of the season, playing among the pups in company with their yearling sisters. It will never be possible to enumerate these younger classes of seals.

THE LOSSES AMONG YOUNG SEALS.

One element of uncertainty regarding all the younger classes of seals lies in the absence of any definite information regarding the losses they sustain at sea during their early migrations. We know that such loss must be great, but that is all. From all the data at hand it seems certain that not more than one-third of the pups born in any particular year survive to killable or breeding age. This percentage must have been still smaller in the earlier days, when the herd was more crowded and occupied to greater extent the sandy areas. Doubtless, when the herd was at its maximum, in the seventies, not more than one-fourth of the pups reached the age of 3 years.

It is fortunate that no vital importance attaches to the exact number of these younger animals. The important matter is the number of breeding animals, and this we have. But it is worth while to construct an estimate of the younger classes, if such a thing can be done, and in the quota of the year 1897 we have a basis for fairly satisfactory results.

THE ESTIMATE OF NONBREEDING SEALS.

During this season a quota in round numbers of 20,000 skins was taken on the Pribilof Islands. This number included some 2-year-olds and some 4-year-olds, but as a rule the animals taken were 3-year-olds. Some 3-year-olds were left over, and some that would have been 3-year-olds in 1897 had been killed as 2-year-olds in 1896. We might even the matter up and say that the quota practically represented the normal quota of animals of 3 years old. But as there are elements of uncertainty in the problem, to be on the safe side and for the purposes of argument, we may suppose that there was a maximum of 25,000 3-year-old males which did or should have survived in 1897 from the birth rate of 1894. An equal number of females survived from the same year. These young breeders, which came upon the rookeries to bear their first pups in 1897, have already been included in the estimate of breeding cows.

As nearly as we can judge, the total birth rate for the year 1894 was approximately 200,000. Of these, under normal conditions, about one-third, or something like 65,000, should have survived. The difference between this number and the 50,000 which we have found to actually survive is accounted for by the starvation of pups in 1894.

Treating in the same manner the approximate birth rate of 170,000 pups in 1895, we find that, after making the deductions for loss through natural causes and from starvation, probably 40,000 returned as 2-year-olds in 1897.

Of the 160,000 pups born last year treated in like manner, probably 60,000 appeared in 1897 as yearlings.

THE COMPLETE ESTIMATE FOR ANIMALS OF ALL CLASSES.

This completes our estimate of the younger classes of seals. The figures are merely rough approximations and are to be considered as such. They, however, point in the direction of the truth and are probably not far from it. Putting these various estimates in tabular form we have the following completed estimate of all classes of animals on the rookeries of the Pribilof Islands for the season of 1897:

Animals present at one time or another, season of 1897.

Breeding females	129,216
Pups born	129,216
Active bulls	4,418
Idle bulls (approximate)	5,000
Half bulls (approximate)	10,000
Three-year-old males (approximate)	25,000
Two-year-olds of both sexes (approximate)	40,000
Yearlings of both sexes (approximate)	60,000
Total	402,850

In round numbers, therefore, there were on the Pribilof Islands at one time or another during the season of 1897 400,000 seals of all classes. We wish to again emphasize the fact that these figures, in so far as they refer to other classes of animals than the breeding seals and young, are mere approximations.

DEDUCTIONS FOR LOSSES.

These animals were of course not all alive at the close of the season. Their number had been reduced from various causes, as the death of nursing pups, pelagic sealing, and the filling of the quota. These losses to the herd may be estimated as follows:

Animals known to have died from various causes, season 1897.

Pups, from Uncinaria, trampling, etc	estimated	7,750
Pups, from starvation	do	14,000
Bachelors (quota)		20,890
Pelagic catch (Bering Sea)		16,464
Total		59,104
Total alive during season		402,850
Total dead		59,104
Total alive October 15, 1897		343,746

THE VALUE OF THE ESTIMATE.

The weakness of the foregoing estimate lies in the figures for the nonbreeding animals. It is worked out merely because such an estimate is asked for in our instructions. The figures, however, satisfy the conditions and we believe approximate the truth as closely as it can be reached at the present time. For the estimate of breeding animals, which is really the important thing, we have no apology to offer. It is practically exact.

To eliminate the last element of uncertainty in arriving at a full enumeration of the herd it is only necessary to continue the census of the breeding herd each year for a certain period. Knowing the number of pups born in 1896, in 1899 it will be possible from the quota of that year to tell with reasonable exactness the number which survive to killable age. With each succeeding year the data will become more exact, and in the future the Government can know exactly what quota to expect and what the condition of the hauling as well as of the breeding grounds is. Given the birth rate of any year and the quota of three years later can be determined. In like manner from the quota of any year the birth rate of three years previous can be determined.

THE TRUE BASIS OF ENUMERATION.

The only reliable basis of enumeration has been found and demonstrated. This is a count of live pups. The pups as a class are fixed in their places on the rookery for the first six weeks of their lives. Their mothers may come and go, but they remain. It is not necessary that all the pups on all the rookeries be counted. It would be impossible to make a count on the larger rookeries. But if some typical rookery, as Kitovi, be counted each year to obtain the average size of harem, and then the harems be counted on all the rookeries about the 15th of July, the average harem of Kitovi being applied to them, a census exact enough for every purpose can be obtained. From this census and the quota itself the completed estimate for the nonbreeding animals can be made up.

CHAPTER VII.

THE DECLINE OF THE HERD.

ITS HISTORY.

It necessarily follows from the foregoing review of past and present conditions that the fur-seal herd of the Pribilof Islands has largely declined since it came into the possession of the United States. That this decline is still in progress is shown by the decrease in breeding seals between the seasons of 1896 and 1897 and in the diminished quota. We may now take up in detail a consideration of this decline and endeavor to trace its history and find its cause.

RUSSIAN MANAGEMENT.

Of the condition of the fur-seal herd before it came under American control in 1867 we have but little definite information. That it had a varied history we know. The excessive slaughter which threatened its existence in 1799 was stopped by the advent of the Russian-American Company. Under the earlier years of its régime, however, the seals were indiscriminately slaughtered, females as well as males, the only difference being that it was limited slaughter.

GRADUAL IMPROVEMENT IN METHODS.

Gradually the habits and needs of the herd began to be understood by the Russians and more conservative methods came into vogue. After some catastrophe which involved the herd about the year 1834, of which the cause is not clearly known, the killing of females was prohibited, and for twenty or thirty years before the transfer to the United States in 1867 the killing was limited, as now, to the superfluous males. On coming into the control of the United States the herd was in a growing and prosperous condition.

THE EQUILIBRIUM OF THE HERD.

From the growing ease with which the quota was filled in the years 1871–1875, as shown by the gradual recession of the date at which the required number of skins could be obtained, we may infer that the herd even increased somewhat. For a few years longer, or until 1880 or thereabouts, the herd appears to have remained in a state of equilibrium, or at least a state in which there was neither marked increase nor decrease. It is probable that during this period the annual increment of breeders was practically balanced by the various checks acting upon the herd, chief among which were the natural mortality among the young upon land and the natural death of adult females at sea from old age.

THE BEGINNING OF DECLINE.

About the year 1884, and more particularly after 1886, a decline began to be observable, gradual at first, then more rapid, becoming in the year 1890 alarming.

This decrease in the herd was first felt in a shifting of the hauling grounds and afterwards in a growing scarcity[1] of the killable seals frequenting them. From the year 1871, a quota of 100,000 skins had been annually taken. After 1883, the date at which this number could be obtained from the hauling grounds became relatively later, requiring more frequent and later driving. Finally it was necessary successively to lower the grade of killable seals, until in 1889 to get the quota of 100,000 nearly the entire bachelor herd, down to and including most of the yearlings, was taken. In 1890 the collapse came, when only 21,000 skins could be secured.

THE FAILURE OF THE QUOTA.

The sudden drop from a quota of 100,000 in 1889 to 21,000 in 1890 of course does not represent a correspondingly sudden drop in the breeding herd. In the latter the decrease has been gradual but steady, the deficiency in breeding cows lessening the birthrate of pups, which in turn diminished the annual increment of 3-year-old breeders. It also indirectly affected the hauling grounds by diminishing the supply of bachelors, and this was the effect which first made itself felt. As seals of the proper age became scarce the quota was filled by lowering the age to 2 years and afterwards by including the larger yearlings, thus anticipating the quota of succeeding years. Such a course of action would not have been indulged in except for the fact that the lease under which the islands were then held was approaching its expiration.

THE BREEDING HERD.

The fall in the bachelor herd served to call attention forcibly to the condition of the breeding herd, a matter which up to that time had received no attention, interest being centered solely in the quota of the bachelors. Since 1890 the breeding herd has been more or less constantly under investigation, the results of which, however, owing to misinterpretation of some of the important facts of rookery life and development, leave us confused and uncertain as to the actual number of animals constituting the breeding herd during these years, though they leave no doubt as to its continued decline.

THE QUOTA SINCE 1890.

In the meantime events conspired to confuse the hitherto definite results obtained from the history of the quota. During the years 1891–93 land killing was limited under the modus vivendi to 7,500 annually. After this long rest, when it would have been natural to expect an increased quota, only a limited one was taken, a fact which seems to arise rather from restrictions in the methods of driving than from the lack of seals. We find from the table of daily killing (Appendix I) that during 1894–95 only two drives each were made from the various hauling grounds in the killing season. Middle Hill was not driven from at all in 1895, nor English Bay in 1894. The quotas of 16,000 and 15,000, respectively, for these years do not therefore give any definite information as to the normal condition of the bachelor herd.

THE QUOTAS OF 1894-95.

The probable failure to take the full quota in 1894–95, aided in 1896 to further confuse matters when normal driving was resumed. In this latter year every important hauling ground was driven from at least three times and some of them four times, there being 19 drives, including 31 hauling grounds. In 1894 but 14 drives were made from 15 hauling grounds and in 1895 12 drives from an equal number of hauling grounds. The quota of 30,000 taken in 1896 was therefore affected in a measure by the nature of the killing of the seasons immediately preceding. The quota of 1897 is more nearly normal, but with the years immediately preceding it can not properly be compared.

---

[1] See table of drives and hauling grounds, p. 123.

But if these matters have tended to confuse the data which might have led to a definite measure of decline, they do not obscure the fact of decline. This is everywhere distinct and unmistakable.

THE EVIDENCE OF DECLINE.

ABANDONED GROUNDS.

To the eye of the observer perhaps the most striking proof of decline is in the abandoned rookery spaces. On the rear and on either side of the present rookery areas are great tracts of ground which were once occupied, but which are now grass-grown. The evidence of former occupation is to be seen in the felt-like matting of hair over the surface, in the smooth condition of the stones, worn by the moving animals, and especially in the peculiar vegetation covering the area. These abandoned grounds are now covered with fine yellow grass, known as "seal grass," which grows here and nowhere else.

GRASS-GROWN AREAS.

On some of the rookeries this grass-grown area shows three distinct stages. Close to the space at present occupied is a narrow belt of ground, which is still occasionally wandered over by the seals, and on which the grass is just beginning to spring up in spots protected by stones. This area shades imperceptibly into the absolutely bare region now regularly occupied. Behind this space lies an area of dark green grass, covering ground not now entered by the seals. The luxuriant growth of this grass is due to the fertilizing matter in the more recently abandoned grounds. Beyond this there is an extensive area of thinner yellowish grass of the same general character, its less vigorous growth probably connected with the impoverished condition of the soil.

THEIR EXTENT.

On several of the rookeries these three areas are clearly defined, and on all of them the yellow-grass area is very extensive. On the hauling ground of Lukanin rookery measurements made during the season of 1896 show the area of dark grass to be 16 feet in width and the area of yellow grass 64 feet. The area on which the grass is just starting is less definite, and can not be measured accurately. The outward line of the yellow-grass region marks the extreme limit of ground at any time occupied by the seals. The dark green area marks a stage of more recent abandonment.

On certain hauling grounds the area of abandoned territory is anywhere from ten to twenty times the area at present occupied. This, however, does not mean that there has been a corresponding decrease in the bachelor herds. Observations show that a small band of bachelors can in a few days denude a large grass-grown area if they begin to wander and sleep upon it. Five or six times the present number of bachelors would doubtless denude all these areas.

These abandoned areas, while they do not give exact information regarding the amount of decrease, certainly do offer unmistakable evidence of a large decrease. The presence of the dark green grass area shows also that part of the decrease has been recent, while the area where the grass is just starting indicates that it is still going on.

THE TIME NECESSARY TO ESTABLISH THESE AREAS.

The period necessary for these grass-grown areas to become established was the subject of much debate in 1892. In that year a small plot of ground, then entirely bare, was marked off with cairns of stones. It is now closely filled with the characteristic "seal" grass and other vegetation, including saxifrage and wormwood. This furnishes proof that within four, or at most five, seasons an area abandoned by the seals may become grass-grown. The yellow-grass areas are therefore not of too remote date to be identified with the decline of the herd, which began to make itself felt about the year 1884, thirteen years ago.

PHOTOGRAPHS.

A second evidence of decline is to be found in the comparative condition of the rookeries as shown by the annual series of photographs which have been taken each year since 1892. On certain rookeries, which lie for the most part within circumscribed limits on bowlder beaches, differences are not clearly marked; nor do the photographs of one year compared with the year immediately preceding or following it show very definite results. But when we compare photographs of Tolstoi, or Reef, for example, for 1896 or 1897 with photographs of the same rookeries for 1892, the evidence of decline is marked and unmistakable. In Appendix III will be found examples of these and similar photographs, to which reference should be made.

PHOTOGRAPHS BETWEEN SUCCESSIVE SEASONS INADEQUATE.

That a comparison of photographs for two successive seasons should not show definite results is not strange, considering the shifting and changing character of the rookery population and the broken nature of the ground the seals occupy. By way of illustration, the estimated decline between the season of 1896 and 1897 was in the neighborhood of 15 per cent of the breeding herd. This would mean the absence of 20,000 animals. But as only half of the cows are ever present at one time even at the maximum height of the season, the actual absence of seals involved could not exceed 10,000. There are more than 8 miles of rocky and broken shore line occupied by the breeding seals throughout which this loss must be distributed. That it should not be perceptible to the eye at any one point or be capable of measurement in a photograph is but natural.

THEIR VALUE COVERING LONG PERIODS.

But while it is in general true that the photographs of one season compared with those of the next do not show definite results, we must make one exception. A comparison of the series of photographs for 1894 with those for 1895, wherever the conditions are favorable for showing anything, show a marked diminution in the latter year. In Appendix III some examples of these photographs will be found.

It is evident that between these two seasons the decrease in the herd was more strongly marked than between any other two seasons. The reason for this is of course plain and will be referred to again in its appropriate connection. In a word, the resumption of pelagic sealing in 1894, nearly doubling as it did the draft of the preceding year on the herd, naturally showed itself very strongly on the rookeries in 1895.

PHOTOGRAPHS OF ABANDONED TERRITORY.

There is one way in which the photographs of successive seasons show definite results, and this is in the recording of the absolute abandonment of breeding ground. Thus on the flat at the head of the "slide" on Ardiguen rookery there were 78 cows in the season of 1896 and none whatever in 1897. This fact is clearly recorded in the photographs of the two seasons. Photographs of the large breeding masses on Reef rookery, Tolstoi, and Vostochni, which are calculated to show most plainly the effects of shrinkage, give clear evidence of the fact even between two successive seasons. This evidence might not, however, in view of the daily fluctuations in rookery population, be so clear if it were not corroborated by more definite proof.

THEIR LIMITATIONS.

There are, on the whole, many reasons why photographs are at best unsatisfactory guides to the actual condition of the rookeries from year to year. In the first place, it is difficult to take them on exactly the same dates on account of adverse weather conditions, and to be of value for comparison between two successive seasons they should be so taken. Again, the period during which photographs of any value can be taken is short. It falls within a few days before or after the 15th of July, which was found in the season of 1897 to be the maximum date of rookery population. But between this maximum and the population of the 8th of July there had been an increase of 20 per cent, while on the other hand from the maximum of the 20th of the same month there was a decline in population of 38 per cent.

THEIR RELATION TO THE DAILY COUNTS.

To take a concrete example: The population of the Amphitheater of Kitovi, as counted at its maximum on July 15, showed 703 breeding cows present. On the 14th its population was 556, a difference between the two days of 20 per cent. Photographs for these two days of this rookery in the breeding season of 1897 would have indicated 20 per cent of difference, if they indicated anything. Suppose similar conditions for the year 1896, and that a photograph taken on the 14th of July in one year is to be compared with one taken on the same date of the next, or vice versa. Such a comparison would clearly be misleading. The result would be more striking if the comparison was made between a photograph in one season for the 15th and one in another season for the 20th. If we continue the comparison we find that by the 31st of July our population of breeding cows has declined 46 per cent from its maximum.

Here, however, comes in another element of confusion in the use of photographs. The pups have been growing in the meantime and are becoming more and more conspicuous. They are always at least twice as numerous as the cows, and in a distance photograph they can not be readily distinguished from their mothers. It therefore happens that a photograph taken on the 31st of July for the Amphitheater of Kitovi, when only about half as many cows were present, shows to the casual observer vastly more animals than one taken on the 15th. This condition of things continues throughout the remainder of the summer, the cows becoming more scarce and the pups more conspicuous.

THE TRUE VALUE OF PHOTOGRAPHS.

It is not the purpose of this discussion to belittle the value of photographs. They have their place and importance, but it is not their function to measure the decline which the fur-seal herd is at present suffering, or has suffered in the past from year to year. By a comparison of photographs taken at widely different dates, some of them in July, others in August, Professor Thompson, in his report for 1896, sought to prove that no decline had occurred in the herd between the seasons of 1896 and 1895. In view of this fact it becomes necessary for us to define the importance and limitations of photographs as a measure of decline in rookery life.

Photographs, in our judgment, are of value only as showing the large results or changes which come through long periods of time. The photographs of the rookeries of the Pribilof Islands show us plainly that its herd of seals has suffered a heavy diminution since 1892. Those for the years 1894 and 1895 show clearly the disastrous results of the resumption of pelagic sealing under the regulations of the Paris award. Between the seasons of 1896 and 1897 photographs can only be trusted to record change where breeding ground has been actually abandoned. Of the magnitude of the decrease which the herd has suffered in the past five years photographs afford abundant evidence, but they give no measure either of the total decrease nor of its rate from year to year. Finally, for comparison only photographs taken at middle of July can be used.

TOWNSEND'S CROSSES.

One of the most definite evidences of decline is to be found in the shrinkage of certain large breeding masses on such rookeries as Tolstoi, Zapadni, and Vostochni. This is most plainly shown in the relation of the breeding masses to certain crosses which Mr. Townsend, in 1895, painted to mark their outward extension. During the season of 1896 these crosses were in no case reached at the corresponding period. In some cases the breeding masses fell away from them from 50 to 100 feet. In 1897 the shrinkage was measured by yards where in 1896 it was measured by feet.

SHRINKAGE OF BREEDING AREA.

Another positive evidence of decrease is to be found in the disappearance of certain small patches of breeding seals noted and marked on the rookery maps of 1895, but which were not to be found in 1896. One of these groups of harems was at the southern end of Vostochni. Two others were at the extremities of the breeding ground, known as Zapadni Reef.

TOLSTOI SAND FLAT, ARDIGUEN, ETC.

In 1897 this abandonment of breeding territory was still more noticeable as a result of the minute inspection of the two seasons. On the sand flat of Tolstoi but a small fraction of the area occupied in 1896 was covered this year, and practically no seals were on the slopes behind. At the head of the "slide" on Ardiguen last year were three harems, aggregating 78 cows, as seen on the 14th of July. Making the necessary allowance for absentees, there must have been an actual total of at least

150. This year not a single cow located permanently on this territory, and the three bulls, corresponding to the harems of last year, remained idle throughout the season.

Another point where the shrinkage was plainly marked was at a prominent observation point known as "Old John's Rock," about which during the summer of 1896 a large harem clustered; the ground was fully occupied between it and the water. This year the breeding seals did not reach within 100 feet of this rock at any time during the season. Again the absence of breeding seals from the runways and breaks in the cliffs of Lukanin rookery, another observation point frequented during both seasons, was very marked.

Similar examples might be cited from all the rookeries closely observed. Such abandonment of rookery ground can have but one explanation, namely, decrease in the breeding herd.

THE DECREASE IN DEAD PUPS.

A striking, though indirect, evidence of decline in the breeding herd is brought out by the marked decrease in the mortality among nursing pups in the breeding season. On all the massed rookery portions the population of breeding seals was much sparcer during the season of 1897. On the sand flat of Tolstoi and in the gullies of Zapadni only a small portion of the space occupied in 1896 was occupied in 1897. We are not, therefore, surprised to find the following contrast:

Dead pups, August 10.

Rookery.	1896.	1897.
Tolstoi Sand Flat and adjacent beach	1,495	593
Zapadni Gullies and adjacent beaches	1,314	689
Gorbatch	712	382
Reef	950	642

These counts were made where the death rate had to do directly with the crowding of the seals on certain defective breeding spaces.

THE INCREASED MORTALITY AMONG COWS.

In this connection may be cited one further evidence of decline. On Reef rookery, where 25 cows were found dead in 1896, 42 were found in 1897. The diminished supply of cows led to fiercer struggles for their possession and consequently the death of a greater number. The deaths of cows on the breeding grounds are due chiefly, if not wholly, to the rough treatment by the bulls.

THE DIMINISHED QUOTA.

But the most clear and positive evidence of decline is found in the reduction of the quota of killable seals. The sexes are equal at birth. They must be subject to like natural enemies and hardship. Whatever tends to diminish the bachelor herd must in like measure affect the number of 3-year-old cows which each year take their places as breeders on the rookeries.

For twenty years after the islands came into the possession of the United States it was possible to take each year a quota of approximately 100,000 young males. During at least thirteen years of this period this quota could be obtained easily and without exhausting the hauling grounds. This year it was more difficult to get a quota of 20,000 skins than it was in 1880 to get one of 100,000. The inference is obvious.

THE DECLINE BETWEEN 1896 AND 1897.

As a result of the investigations of the past two seasons we are able now to submit definite and final proof not only of the fact of decline, but also an approximately accurate measure of its rate.

COMPARATIVE COUNTS, 1896-97.

During the season of 1896 a very accurate estimate of the total number of harems on the two islands was made. On certain rookeries and parts of rookeries careful counts of the individual cows present were made at the height of the season and on approximately the same dates each year. Afterwards a thorough enumeration of the live and dead pups on the same breeding grounds was made. We have had occasion to criticise and revise our detailed census of 1896, but this revision does not affect the actual counts for that year, which we have no occasion to alter.

These comparative counts for the two seasons are as follows:[1]

Actual counts, 1896-97.

Rookery.	Harems.		Cows.		Pups.	
	1896.	1897.	1896.	1897.	1896.	1897.
Kitovi	182	179	3,152	2,436	6,049	5,289
Lagoon	120	115	1,474	1,319	2,484	2,598
Tolstoi (cliffs)	108	98	1,498	1,286	2,664	(*a*)
Zapadni Reef	176	114	2,256	1,049	3,862	3,041
Polovina (cliffs)	86	61	1,266	747	2,496	2,200
Little East[2]	(*b*)	33	(*b*)	497	1,350	1,190
Ardiguen	27	33	550	470	(*b*)	736

a Not counted.

b Count of 1896 rejected as obviously incorrect.

---

[1] These figures are the joint work of Mr. Clark, of the American commission, and Mr. Macoun, of the British commission. They were accepted by Professor Thompson, though made in his absence, as he did not arrive in time to witness the work. After the departure of Mr. Macoun and ourselves from the islands Professor Thompson, assisted by Mr. Lucas, undertook a recount of the live pups. Mr. Lucas's action in the matter was one purely of courtesy, no responsibility for the work of enumeration having been assigned to him by the commissioner in charge.

In the recount on Kitovi rookery Professor Thompson found 5,534 live pups; Mr. Lucas, 5,577. In a single portion, of the rookery Mr. Lucas found 1,318 pups, whereas Professor Thompson found only 1,247. No effort was made by recounting or otherwise to remove discrepancies. The mean of the two counts, or 5,555, was assumed as the total. To this the dead pups being added, a total of 5,760 pups for this rookery was found as against 5,289 originally counted.

Afterwards a recount of Zapadni Reef was made. Here, following the same methods, a total of 2,786 pups was found as against the total of 3,041 of the original count. No further recounts were attempted.

Professor Thompson has seen fit to substitute the results of his recount on Kitovi rookery for the official one, rejecting as unsatisfactory his recount of Zapadni Reef. A comparison of the two counts shows plainly why. Had Professor Thompson substituted both counts, or better yet, had he completed the recount on the remaining rookeries and used the completed results, his action would have been less open to criticism.

The results of the recounts are in no sense binding upon the American commission. They bear on their face the evidence of their faulty character, which is strengthened by the admission that one at least is in error. It may be said that Mr. Macoun does not share with his colleague the faith which is placed in the recount.

We may say that in these recounts no precaution was taken which was omitted in the original count. The conditions of the count by Clark and Macoun were more favorable. The pups were ten days younger, were less active, and were not going into the water. The count was made in a continuous session of five hours, whereas in the recount the rookery was abandoned for a period at noon, giving room for the possibility of shifting among the pups.

The grave objection to the recounts, however, rests in the fact that neither Mr. Lucas nor Professor Thompson had had any considerable experience in the work of counting. On the other hand Messrs. Clark and Macoun made their count on Kitovi rookery after having counted 10,000 live pups in 1897 and nearly 25,000 in 1896, to say nothing of 27,000 dead ones and great numbers of cows and harems.

There is no work in which experience and adaptability count for more than in the counting of the live pups. The original counts, therefore, stand to the recounts as the work of experts to that of amateurs. It is with great reluctance that we refer to this matter, and we would not mention it were it not that Professor Thompson has used it to cast discredit on figures undoubtedly accurate and trustworthy. Even with his substitution there is still left by his own accepted figures a positive decline of 9.1 per cent. The difference between this and 12 per cent is of no real importance except that the use of the discrepant figures serves needlessly to weaken the apparent force of evidence drawn from actual enumerations.

SUMMARY OF PERCENTAGES.

From these figures we may draw the following summary of percentages:

Percentages of decline as shown by counts.

Count of—	1896.	1897.	Percentage of decrease.
Harems	699	633	9.5
Cows	10,198	7,307	28.34
Pups	16,241	14,318	11.8

The results in this limited count of harems are not so striking as in the completed count of harems for each season on all the rookeries. These were 4,932 in 1896 and 4,418 in 1897, a decrease of 10.41 per cent.

DECREASE IN THE AVERAGE SIZE OF HAREMS.

In connection with this marked decline in the number of breeding families it may be noted that on Kitovi rookery, which we have taken as typical of rookery conditions in general, there is also a marked decrease in the size of the individual harem. In 1896 the apparent size of harem, as shown by a count of cows, was 17.3; in 1897 it was 13.6, a decrease of 21 per cent. As this rookery was counted on exactly the same date and under like conditions these figures may properly be compared and are significant.

THE COUNT OF COWS.

The count of cows, which shows a decrease of 28.34 per cent, is less certain but is still significant. Owing to their constant coming and going, the number of females on the rookeries in the height of the season varies greatly from day to day. This will be clearly seen by reference to the daily counts of cows on Lukanin and Kitovi rookeries during the season of 1897, which will be found in Appendix I. The count of cows and pups, as recorded above in the case of Zapadni Reef and Polovina cliffs, where the latter were three times as numerous as the cows, furnishes a good illustration. At the same time, while the decrease shown by the comparative counts of cows can not be taken at its full value, the fact of large decline thus shown can not be ignored.

THE COUNT OF PUPS AN ABSOLUTE MEASURE.

The final and absolute measure of decline, however, is to be found in the counts of pups. As we have seen, the number of harems fluctuates. The cows come and go, and throughout the breeding season the rookeries are undergoing constant change. With the pups this is not the case. They are fixed upon the rookery to which they belong at least for the first six weeks of their lives. A count of these animals, living and dead, is an exact index to the number of breeding cows which have during the season appeared upon the breeding ground in question.

LAGOON ROOKERY.

For the whole number of pups counted, and the area covered is varied enough to be typical, we find that there has been a decrease of 11.8 per cent. By reference to the count on Lagoon rookery, however, it will be seen that instead of a decrease since 1896 there has been an increase of 3 per cent. This increase is apparent rather than real for both the number of cows and the number of harems present on this rookery in the height of the season had decreased. As a matter of fact we know that the count of Lagoon rookery for 1896 was much less accurate than that for 1897 because in the latter year it was made under more advantageous conditions. We are convinced, therefore, that the count of 1896 is somewhat in error.

If we drop Lagoon rookery from the calculation the percentage of decrease, as shown by our count of pups, rises practically to 15 per cent. We do not insist upon this, and are willing to abide by the figure of 12 per cent which the completed count shows. The difference between 12 per cent and 15 per cent is immaterial. The fact remains that by the count of pups, which is the surest basis of knowledge as to the condition of the herd, the birthrate, and consequently the herd of breeding females, has suffered since the season of 1896 a decrease which can not be less than 12 per cent, and which we have good reason to believe is as high as 15 per cent.

THE QUOTAS OF 1896 AND 1897.

There remains one further element of comparison between the seasons of 1896 and 1897 to complete the proof of the decline in the fur-seal herd. This is the comparison of the quotas of the two years.

THE QUOTA OF 1896 FIXED.

In 1896 30,000 skins were obtained, the quota being fixed at that figure. It is probable that a few thousand more killable seals could have been taken had the quota been an indefinite one. On the other hand, however, a number of 2-year-old seals were taken, which to a certain extent anticipated the quota of 1897. To the best of our knowledge these two elements in the quota of 1896 balance one another, and we may consider its total as fairly representative of the hauling grounds of that year.

THE QUOTA OF 1897 INDEFINITE.

In 1897 the quota was left without definite limit to secure the utmost product of the herd, the rookeries being already grossly overstocked with male life so far as the need for breeding purposes was concerned. The driving was therefore done more thoroughly and continued for a longer period, extending until the 10th of August, whereas in 1896 it was terminated on the 27th of July. To make the conditions surrounding the quota of 1896 and 1897 clear, we may here insert the statistics regarding the killings of the two seasons.

Killings for the quota, 1896.

ST. PAUL ISLAND.

Hauling ground.	Date.	Animals killed.	Percentage killed.
Foodskins	Autumn 1895	929	....
Do	Spring	384	....
Zoltoi	June 19	283	....
Watchmen	June 20	2	....
Northeast Point	June 23	1, 414	....
Do	June 24	1, 408	....
Reef	June 27	2, 076	....
English Bay, Middle Hill, Tolstoi	June 29	1, 398	....
Northeast Point	July 2	1, 396	....
Do	July 3	1, 109	....
Zoltoi, Lukanin	July 6	1, 585	....
Zapadni	July 7	784	....
Polovina	July 8	961	....
Reef, Zoltoi	July 10	1, 271	....
Northeast Point	July 13	1, 045	....
Do	July 14	1, 169	....
Reef, Zoltoi	July 15	849	0. 44
Tolstoi, Middle Hill, English Bay	July 16	1, 138	. 46
Northeast Point	July 21	808	. 35
Do	July 22	1, 047	....
Polovina	July 23	585	. 47
Lukanin, Kitovi, Zoltoi, Reef	July 25	1, 630	. 42
Middle Hill, Tolstoi, Lukanin	July 27	621	. 43
Total		23, 842	....

ST. GEORGE ISLAND.

Hauling ground.	Date.	Animals killed.	Percentage killed.
Food skins	Spring-Autumn	327	....
East rookery	July 19	576	0. 32
Zapadni	July 24	568	. 76
North and Staraya Artel	July 26	999	. 72
East	July 29	804	. 62
Zapadni	July 2	333	. 68
North and Staraya Artel	July 6	700	. 56
East and Little East	July 7	614	. 57
Zapadni	July 9	221	. 40
North and Staraya Artel	July 13	487	. 46
East	July 21	221	. 27
North and Staraya Artel	July 24	308	. 17
Total		6, 158	....

Killings for the quota, 1897.

ST. PAUL.

Hauling ground.	Date.	Number killed.	Percentage killed.
Food skins	Autumn and spring	1,701	
Reef	June 15	492	0.65
Zapadni	June 18	316	.67
Zoltoi, Reef, and Lukanin	June 23	708	.48
Tolstoi, Middle Hill. English Bay	June 26	1,098	.64
Northeast Point	June 30	790	.57
Do	July 1	703	.58
Lukanin	July 2	208	.53
Reef and Zoltoi	July 5	703	.63
Tolstoi, Middle Hill, English Bay	July 6	1,230	.67
Northeast Point	July 8	1,713	.65
Polovina	July 9	456	.68
Reef and Lukanin	July 12	804	.50
Northeast Point	July 14	1,249	.58
Zapadni	July 16	886	.53
Middle Hill and English Bay	July 17	297	.66
Lukanin, Zoltoi, and Reef	July 19	988	.39
Northeast Point	July 22	1,322	.34
Polovina	July 23	274	.24
Lukanin and Reef	July 24	526	.23
Zapadni	July 26	514	.27
Tolstoi and Middle Hill	July 27	199	.20
Northeast Point	July 29	268	.16
Do	July 30	276	.20
Polovina	July 31	108	.16
Reef and Lukanin	August 1	418	.19
Middle Hill and English Bay	August 5	101	.15
Reef	August 7	172	.20
Total		18,520	

ST. GEORGE.

Hauling ground.	Date.	Number killed.	Percentage killed.
Food skins to date		228	
East	June 16	150	0.36
Food skins	June 19-24	10	
Zapadni	June 25	140	.34
Food skins	July 1	2	
Staraya Artel	July 3	70	.16
Food skins	July 3	4	
East	July 7	227	.22
Food skins	July 8-10	6	
North and Staraya Artel	July 13	253	.26
East	July 16	209	.22
Food skins	July 17	4	
Zapadni	July 19	104	.13
East, North, and Staraya Artel	July 22	391	.18
Food skins	July 24-31	10	
East	August 2	179	.16
North and Staraya Artel	August 4	153	.16
Food skins	August 5-9	6	
East, North, and Staraya Artel	August 10	207	.12
Food skins	August 11	17	
Total		2,370	

THE QUOTA OF 1897 HARDER TO GET.

It must be evident from a study of these figures that the quota of 1896 was in every way easier to procure than that for 1897. In the latter year the driving was continued ten days longer on St. Paul Island and sixteen days longer on St. George. The lowest percentage of animals killed in any drive on St. Paul in 1896 was 35; in 1897 it was lowered to 15 per cent. On St. George the lowest point reached in 1896 was 17 per cent; in 1897 it was 12 per cent. The reduction in the percentage of seals killed marks the degree of exhaustion of the hauling grounds.

THE QUOTA A DIRECT MEASURE OF THE BREEDING HERD.

This comparison of the bachelor herd of 1896 and 1897 is a direct measure of the condition of the breeding herd in the years 1893 and 1894 when these killable seals were born. It is not a measure of the condition of the breeding herd of 1896 and 1897. To understand why the loss in the breeding herd for the season of 1894 as compared with that for 1893 was nearly 30 per cent, while the present rate of decrease is but 15 per cent, it is only necessary to consider that in 1894 pelagic sealing was resumed in Bering Sea after the modus vivendi and the herd that year suffered its greatest loss, amounting to 60,000 seals, whereas in 1893 its loss was only 30,000. This fully accounts for the great difference between the decrease for the season of 1897 in the fur-seal herd as measured by the product of its hauling grounds and as measured by its birth rate for the same season. The pelagic catch which affected the breeding herd between 1896 and 1897 was about one-half as great as that which affected the breeding herd between 1893 and 1894. In other words, the pelagic catch of 1894 was double that of 1893, while the catch of 1897 was about one-half that of 1896.[1]

THE QUOTA OF 1897 AND THE PARIS REGULATIONS.

Not only does this marked decrease in the quota emphasize the fact of decline in the herd, but it fixes more clearly than ever the responsibility upon pelagic sealing, and forcibly condemns the regulations of the Paris Award, in the opening year of the operation of which the loss which it indicates was sustained.

THE TOTAL DECLINE IN THE HERD.

In this comparison of the quota of killable seals with the breeding herd of the year in which its individuals were born, we find the necessary basis for an estimate of the total decline which the herd has suffered. The killable seals found in 1897 bear a direct relation to the breeding herd of 1894. In like manner the quota of 100,000 skins taken in 1880, for example, bears a direct, and we may suppose, proportionate relation to the breeding herd of 1897. The breeding herd which could without difficulty furnish 100,000 killable seals in 1880 must have been at least five times as great as the herd which can to-day with difficulty furnish 20,000. And when we take into account the increased effort required to secure the latter quota, we may assume that the total decline in the herd really lies between four-fifths and five-sixths of its maximum size.

---

[1] This fact is overlooked by Professor Thompson when he asserts "that the ratio of the catch (quota) of 1897 to that of 1896 is not a fair proportionate measure of, but is largely in excess of the actual diminution of the general herd." (Report of 1897, p. 11.)

CHAPTER VIII.

THE CAUSE OF THE DECLINE.

JOINT AGREEMENT OF 1892.

At the joint meeting of American and British investigators in 1892, preceding the Paris Arbitration, an agreement was reached that "since the Alaska purchase a marked diminution in the number of seals" on the Pribilof Islands had taken place, and that this diminution was "the result of excessive killing by man." But when an attempt was made to analyze what was meant by "excessive killing" each commission took a different view. The commission for the United States claimed that it was the slaughter at sea of female seals that was responsible; the commissioners for Great Britain held that land killing was chiefly, if not wholly, responsible.

As has already been shown, the decline admitted in 1892 has continued to the present time and is still going on. It only remains for us now to locate if possible the cause of the decline, to distinguish between land and pelagic killing.

NO NATURAL CAUSE COMPETENT TO EXPLAIN THE DECLINE.

It may be remarked at the outset that the investigations of the past two seasons have brought to light no natural cause of injury to the herd which can be connected with its decline. The subject of mortality among the fur seals is discussed in detail in Part III of this report. It is only necessary here to say that among the adult seals no mortality was found which was not due, directly or indirectly, to contests among the bulls, or to rough treatment of the cows by the bulls. In the case of the very young pups an hitherto unknown but apparently customary cause of death, due to the ravages of a parasitic worm infesting crowded and sandy breeding areas, was found to be responsible for a large number of deaths. In the case of very young pups a certain number are also trampled to death by the bulls. The number dead from these causes in 1896 as counted amounted to 11,000. Doubtless a considerable number were overlooked.

NATURAL CAUSES OF MORTALITY CONSTANT.

It may be said, however, that both these causes of death are as old as the herd itself, and were more active when the herd was in its prime. They are directly related to the crowded condition of the rookeries and are, therefore, to-day, at a minimum. The photographs[1] taken by the British commissioners in 1891 and 1892 show that the deaths from Uncinaria were greater then in proportion as the herd was greater. The whitened bones of pups on Tolstoi sands, in areas not occupied in 1891, show plainly that it antedates even that time, and there is no reason to suppose that it did not exist throughout the period when the herd was in its prime. It was probably the determining check which prevented the herd's indefinite increase. We may infer from the fighting and struggling of the limited number of bulls at present on the rookeries that in a state of nature, when the males were practically equal to the females, the destruction from such fighting among all classes of seals must have been enormous.

---

[1] A photograph taken in 1891 by Dr. George M. Dawson shows a part of the sandy northern end of Tolstoi rookery thickly strewn with dead pups, evidently killed by the worm. The photograph will be found among the illustrations in Appendix III. In the following year Mr. Macoun reports finding by actual count 4,000 dead pups on the sand flat of this rookery. These facts, tending to show the presence of breeding seals and their young in territory far beyond the present confines of Tolstoi rookery, are also valuable as proving the great shrinkage of this rookery since 1891.

THE REAL CAUSE OF DECLINE AN ARTIFICIAL ONE.

We may therefore assume that the cause or causes which have lead to the decline of the herd are not inherent in the herd itself. In short, we may come at once to the conclusion arrived at in 1892 that interference by man, and that alone, is chargeable with the decline.

LAND AND SEA KILLING.

There are two ways and two only by which the acts of man have come to affect the fur-seal herd. These are (1) by killing on land, which has been practiced ever since the islands were discovered in 1786, and for the last half century, at least, without change; and (2) killing at sea, which has been practiced to a limited extent by the Indians off the west coast of America from a very early date, but which since about 1880 has been greatly extended by the introduction of sailing vessels under the management and direction of white men. We may consider first the operations of land killing and their effect on the herd.

A. LAND KILLING—ITS METHODS.

ANIMALS KILLED.

Land killing on the Pribilof Islands has since about the year 1835 been confined strictly to the removal of a definite number of young males, chiefly 3-year-olds, with occasional "long" 2-year-olds and "short" 4-year-olds, which approximate the 3-year-olds in size. At times the average size of seals killed has varied from this standard, leaning to the larger seals and again to the smaller animals, as the demands of the market or the condition of the hauling grounds have dictated.

KILLING SEASON.

The regular killing season on the islands lies between the 1st of June and the 1st of August. During the period from about the middle of August until about the middle of October the skins of the seals are not in prime condition, being stagy, as it is called, owing to the shedding of the hair. After the middle of October killing is resumed to a limited extent to furnish meat for the natives. In like manner the seals are killed for food as soon as they arrive in the spring, usually early in May. These food skins are accepted as part of the quota and are included with those taken in the regular killing season.

THE DRIVING OF THE SEALS.

The young bachelor seals, which are the class taken for their skins, haul out on the sand beaches or in the rear of the rookeries and at a distance from them. In the early morning the natives visit such hauling grounds as have been selected, and, surrounding the animals, drive them inland to the point where they may conveniently be slaughtered. As illustrating this process of driving, we may quote the following record taken from the field notes of the commission:

THE DRIVE.

The drive from Gorbatch and Reef rookeries this morning (July 15) was witnessed by Dr. Jordan, Professor Thompson, Dr. Stejneger, Mr. Lucas, and Mr. Clark. Captain Moser and Lieutenant Garrett, of the *Albatross*, were also present. Mr. Crowley, Treasury agent, conducted the movements of the visitors. Fifteen Aleuts made up the driving party.

We left the village at 2 o'clock in the morning. It was then light enough to make one's way without difficulty. After a few minutes' walk we reached Zoltoi sands, a beach about one-fourth of a mile from the village, at the angle of which the bachelors from Gorbatch rookery haul out to reach the rocky slope above. The drivers ran in quickly between the seals and the sea and soon had the animals rounded up in a large pod. From a similar hauling ground on the shore just across the neck of the peninsula another pod was in like manner rounded up. The two pods combined were left in charge of three men to be driven across the sands to the village killing ground a few hundred yards beyond.

We then proceeded to the extreme point of the Reef peninsula. The hauling ground of Reef rookery lies in the rear of the breeding ground and has four well-marked runways connecting it with the sea, on which no harems are located. A line of idle bulls keeps clear a considerable space between the hauling ground and the rookery. From the head of the various runways and in the intervening space pods of sleeping bachelors were rounded up, the Aleuts passing between the idle bulls and the bachelors and turning the latter up the bank to the flat parade ground back of the hauling ground. Here the pods were all united in one large group and the drive started on its way. It was 3 o'clock when we reached the point, and by 3.30 the drive was in motion.

After passing over a short space of ground, scattered at wide intervals with irregular bowlders and having a gentle slope, the drive came into the level grassy plain of the parade ground. Here the herd, which numbered about 1,500 bachelors, was separated into two parts for greater ease and safety in driving. While one pod was allowed to rest the other was driven slowly forward in the direction of the village. Three men were now assigned to each pod, and the rest of the drivers allowed to return to the village to make ready for the killing. We followed the first herd.

Over the green turf of the parade ground the drive moved along quietly and without difficulty. The drivers took their positions one on each flank to repress any lateral movements, and the third brought up the rear. There was no noise or confusion. In general the seals were allowed to take their own time and go at their own pace. Those in the advance acted as leaders, and the rest of the flock followed naturally after them. At the beginning the seals showed some reluctance in leaving their hauling grounds, and made ineffectual attempts to break away. But after the drive was under way they moved forward apparently as a matter of course. When the leaders showed an inclination to take the wrong course the men on the flank simply stood up and raised a hand, which was sufficient to turn them back into the way. For the most part the men kept out of sight of the seals.

The seals on the drive do not keep up a continuous motion. They take ten or a dozen steps and then sit down like dogs to rest and pant, resuming their way when they find that their companions have gone on. The leaders set the example, and as they are rested by the time the rear members of the herd have come to a standstill, they move on and are ready to stop by the time the rear guard have started. The result is that some part of the herd is moving all the time and the progression is continuous.

There is a tendency on the part of the young seals to go faster than the older ones, of which a large number were included. By a gradual sifting process the old fellows fell to the rear, and on several occasions pods of from a dozen to twenty were cut off and allowed to return to the sea.

All the seals and especially the larger ones showed signs of fatigue. They appeared to be hot and excited, and a cloud of steam rose constantly from the moving animals. This steam had a strong musky smell. When the herd stopped, individual seals would often sprawl out on the ground, raising their hind flippers and waving them fan-like evidently in an effort to cool off. After resting a moment the seals were ready to move on apparently refreshed. Continuous exertion is evidently hard on them, but they quickly recover from exhaustion. As soon as the flock comes to rest for a few moments' breathing, they begin to bite one another and push in an unconcerned fashion until they are reminded by the absence of their companions that they must keep moving.

The seals were not urged forward, but were allowed to take their own time. When the herd was brought to rest for a few minutes, the rear driver started them on by clapping his hands or by rattling a stick on a rock. Our presence evidently urged the seals, and made the drive really harder than it would ordinarily have been. The Aleuts seem to have a way of handling the seals that they understand.

A short distance brought us to the end of the grassy plain and into an area of ground filled with embedded bowlders. These were for the most part flat and worn smooth. It looked like hard ground for the seals, but in reality they seem to get over it better than the flat ground. On the flat there was constant crowding, while here the rocks kept the seals apart. The animals are really more familiar with the rocky ground, their breeding rookeries with few exceptions being on the rocky beaches.

After passing over a slight ridge, where the passageway became narrowed by projecting cliffs and where there was a good deal of crowding and scrambling, the drive left the bowlder-strewn path and passed into a valley overgrown with tall Elymus grass and lying between rows of sand dunes also grass-grown. The seals seem to be refreshed by the moisture of the grass, which was wet with dew and rain.

This grassy plain led into the top of the bowlder-set slope above Zoltoi sands, from which the earlier seals were driven. The seals passed down this slope without difficulty and came into the level sand flat. Here the first really hard work of the drive began. The seals seemed to find their greatest difficulty in walking on the yielding sand. Their flippers take hold of the rocks like rubber, but slip back in the sand. No rocks prevented the animals from crowding. They stepped on each other's flippers, became much excited, and seemed generally worried.

But in a few minutes the sands were passed and the herd emerged into the grass-grown killing ground. As soon as the seals came to a standstill, they seemed to forget their troubles. At once they began biting, snarling, and blowing at one another as though nothing had happened. They were then turned into the little lake beside the killing ground to cool off, and were herded up on the bank to rest until their turn came to be killed.

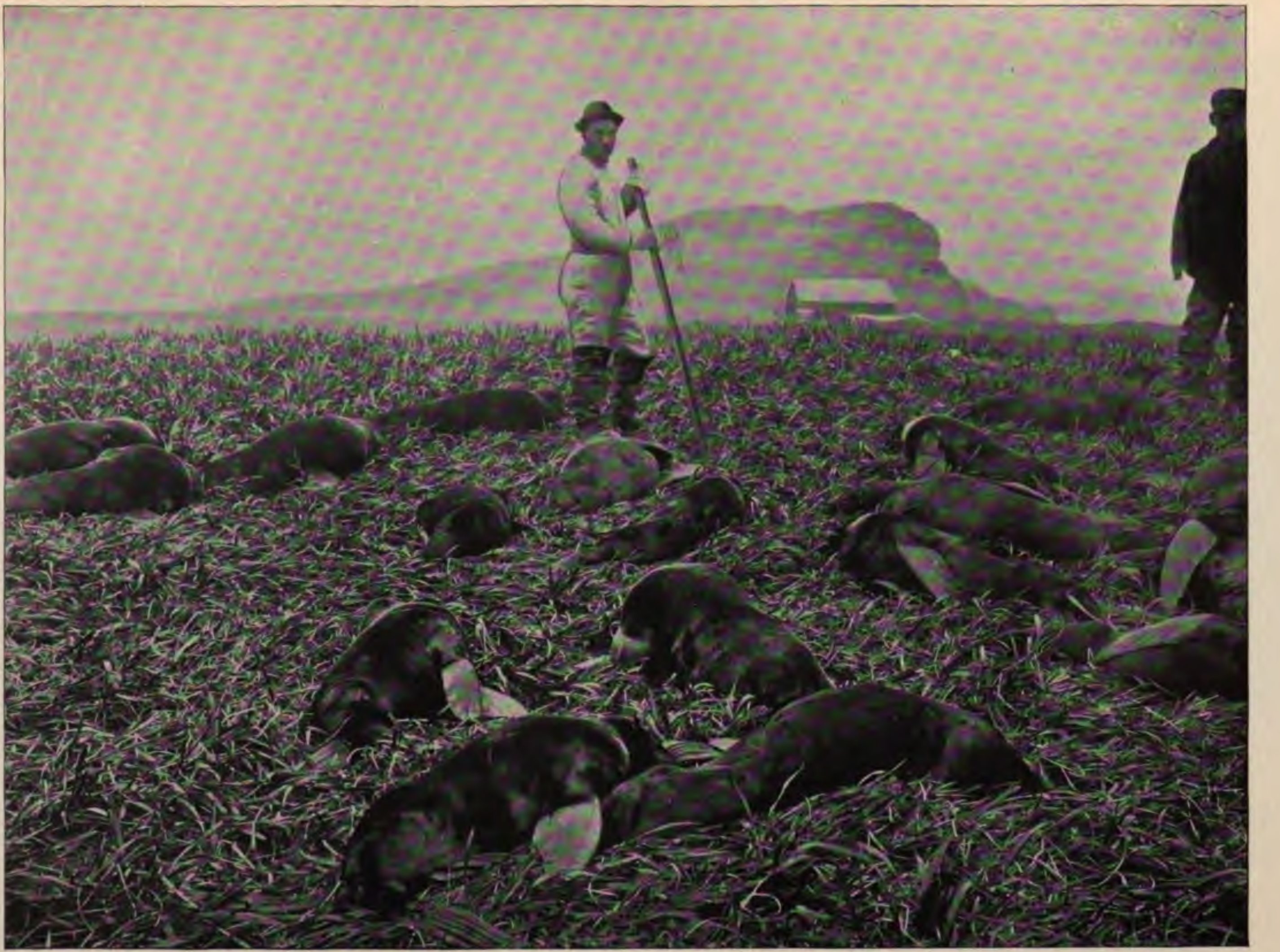
It was 5 minutes after 5 when the first herd reached the killing ground. The second arrived three-quarters of an hour afterwards, having taken more time on the way.

THE KILLING.

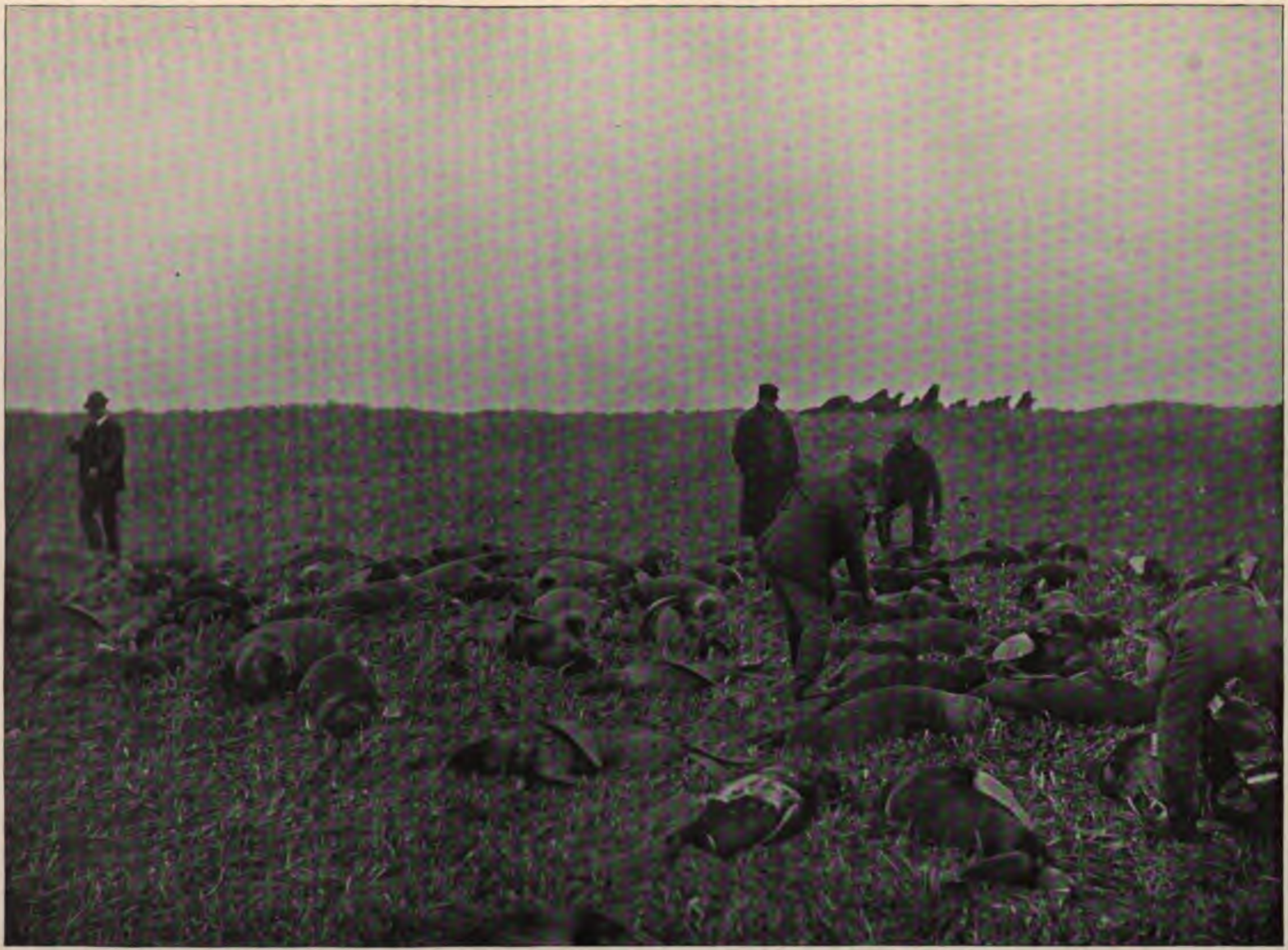
After the seals have sufficiently rested and cooled off the killing is begun. The large drove of animals is put in motion in the direction of the spot where the killing is to begin. Two men close in on the moving animals and cut off a small pod of from twenty-five to fifty, turning the main body back. This small group is driven up within reach of a number of men armed with clubs. These "cull" out the "killable" seals (3-year-olds, large 2-year-olds, and small 4-year-olds) by striking them on the head, allowing the nonkillable seals (yearlings, small 2-year-olds, and all "wigged" seals) to escape and make their way back to the sea. As soon as one pod is knocked down, a second is cut out and driven up. This process is continued until the drove is exhausted.

THE ALEUTS.

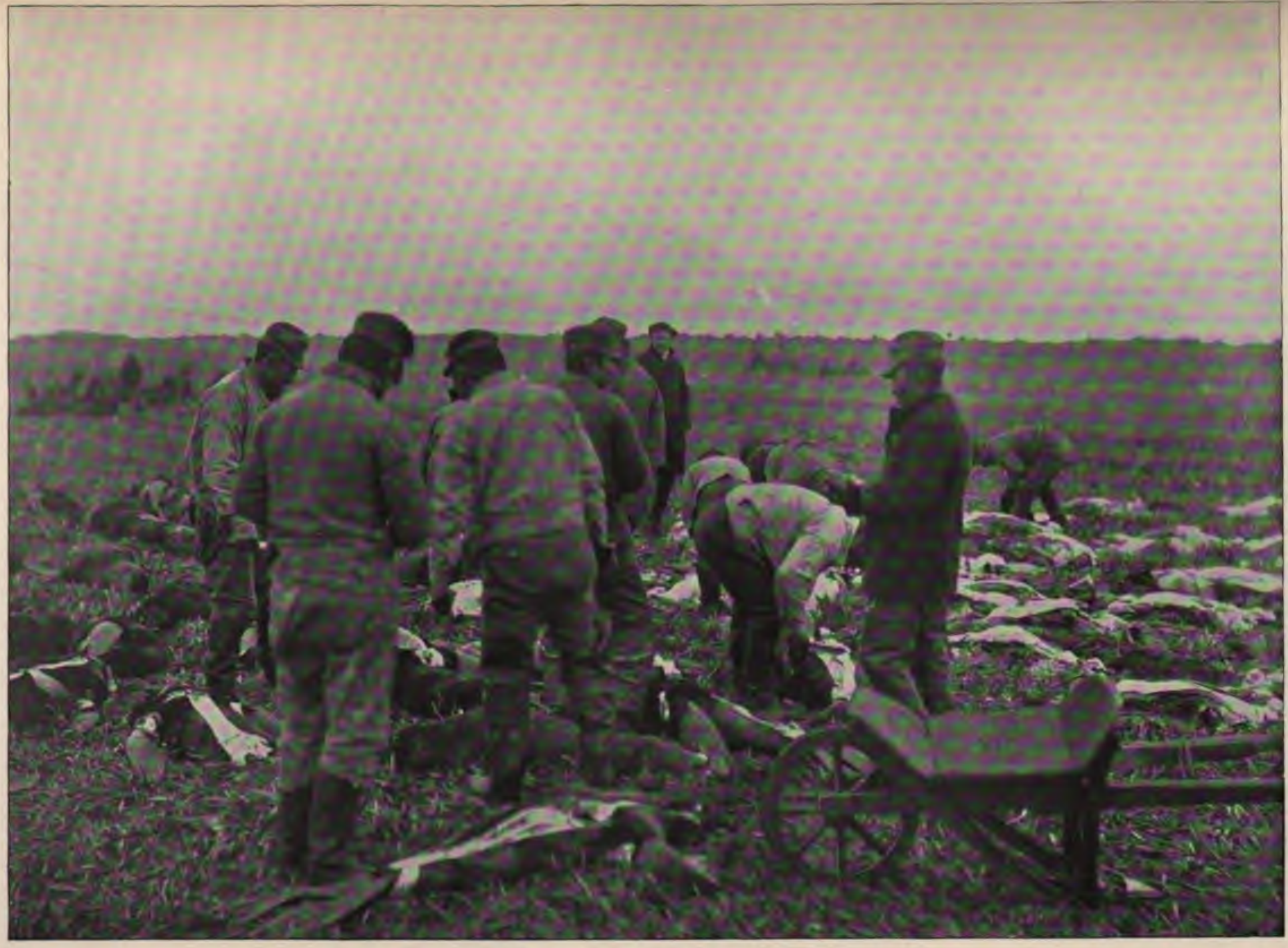
The operations of the killing ground are carried out by the Aleuts, under the immediate direction of the native chief, who is in turn subject to the direction of the agent of the lessees. The latter supervises the clubbing and indicates the proper grade of animals to be selected. The drives are authorized by the agent of the Government, and he is required to be present on the killing grounds to look after the interests of the Government as the owner of the herd.



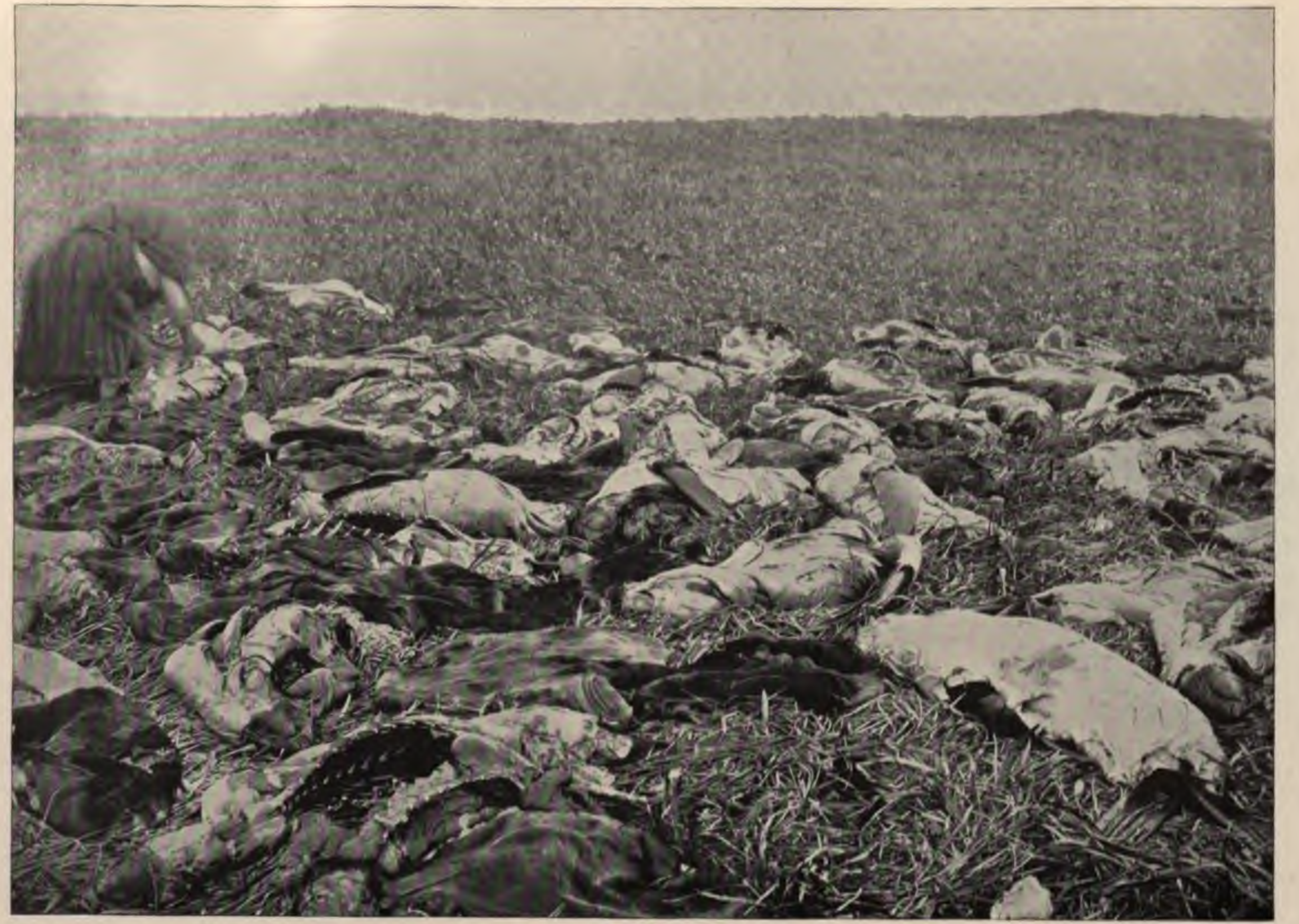
A "POD" OF SEALS JUST KNOCKED DOWN.



"STICKING" SEALS; REJECTED SEALS RETURNING TO THE BEACH.



THE SKINNING GANG AT WORK.



SKINS REMOVED, FOOD MEAT BEING CUT FROM THE CARCASSES.

With the knocking down of the killable seals and the release of those not suitable, the work of handling the seals on land ceases to have any effect on the life of the herd. The processes of taking and curing the skins have been so well described by Mr. Elliott and others that it is hardly necessary to redescribe them, but for the sake of completeness a brief summary may be given.

SKINNING THE SEALS.

As the animals are clubbed they are stretched out in order, with space for the skinners to work about them. The skull of the fur seal is its weakest point, and the blow of the club renders the animal instantly unconscious, if it does not kill it outright. It is immediately stuck to the heart with a knife, which serves the double purpose of insuring death and bleeding the animal.

THE DIVISION OF LABOR ON THE KILLING FIELD.

The Aleuts, by whom the various operations are carried on, follow at present a systematic division of labor, working in four sections, the operations of "clubbing," "sticking," "flippering," and "skinning" going on simultaneously. The clubbing and skinning are done by the most skillful and experienced of the men. The beginners do the sticking and flippering. This last process involves the cutting of the skin loose from about the nose, tail, and flippers, and slitting it through the median line of the belly. When this is done the animal passes into the hands of the skinner, who removes the pelt with a few quick strokes of the knife, spreading it out flesh side downward on the grass to cool.

THE TREATMENT OF THE SKINS.

The skins are gathered up in wagons and counted into the salt house, where they are salted in tiers, with the flesh side up, layers of salt alternating with the skins. After lying thus for five or six days they are taken out and resalted in reverse order. They remain in this salt for about ten days or two weeks, when the process of curing is complete, and they are taken out, wrapped in neat bundles, each containing two skins, and tied securely, ready for shipment.

The skins are then counted into the bidara, which is to lighter them to the ship, and are counted for a third time into the hold of the vessel. At San Francisco they are placed in casks and shipped to London, where they are dressed and dyed and finally distributed to be manufactured into garments.

THE EFFECTS OF LAND KILLING.

Owing to the polygamous habit of the fur seals, the greater part of the male life born is superfluous for breeding purposes. For the 130,000 breeding cows found on the rookeries of St. Paul and St. George islands in the season of 1897, 4,418 bulls were adequate, or at least out of fully 10,000 adult bulls ready and willing to serve harems, only this number were able to obtain them. Therefore only 1 bull in 30 is absolutely necessary under present conditions. That this limit could be materially lowered without positive danger to the herd is conclusively shown by the history of the Russian herd on Bering Island, where the observations of the past three years, as detailed by Dr. Stejneger, show that a male fur seal is capable of attending to the wants of between 100 and 200 cows.[1]

---

[1] Stejneger, Prel. Report, 1897, p. 11.

REMOVAL OF SUPERFLUOUS MALE LIFE BENEFICIAL.

Moreover, the removal of this superfluous male life is not only possible, but is really beneficial to the herd. As already indicated, the only deaths among adult bulls and cows discovered upon the rookeries of the islands resulted from the struggles of the bulls among themselves or to obtain possession of the cows. In the death of young pups also this fighting and struggling of the bulls is a small but by no means insignificant cause of loss. In 1896 the great early mortality among nursing pups was wrongly ascribed to the trampling of the fighting bulls. But while the more complete and satisfactory investigation of 1897 shows another and more important cause, there still remains a considerable loss from this source. This loss is now insignificant compared with what it was in the wild state of the herd. When the number of adult males and females was practically equal, the destruction both among the cows and among the pups must have been enormous. It undoubtedly rivaled the ravages of the worm Uncinaria in its destructive work and combined with it to offset the natural increase of the herd.

POSSIBILITY OF OVERKILLING.

While as a general principle the removal of these superfluous males is beneficial to the herd, excessive removal would undoubtedly lead to disastrous results. The percentage of males required for the needs of propagation is small, but it is essential, and if reduced too low or cut off entirely the effect must be injurious. Such excessive killing would be felt in the scarcity of bulls, from which cause, through inadequate service, the usual increase of pups would not be born and the herd must ultimately begin to fail. It is on this ground that land killing becomes a possible source of danger to the herd.

A HYPOTHETICAL CASE.

To understand how such killing would act, let us take a hypothetical case. If in any given year absolutely every 3-year-old male was killed to fill the quota, this would involve the absence of representatives of this class of seals from the reserve of bulls for the replenishment of the rookeries in subsequent years. It would not affect the breeding bulls, nor the reserves of four, five, and six years. These latter would supply the deficiency in the breeding stock caused by old age for at least ten years, and it would take that period at least to show the effect of the close killing. If it was not repeated, no influence would be felt. The 7-year-old bull of the following year would simply enter the rookeries as a 6-year-old.

But suppose the killing was continued through a series of years, every 3-year-old being killed, the reserve would in time be cut off and the stock of breeding bulls would die out. It is impossible to say how long it would take to produce this effect, because we do not know the length of the life of the bull. We may infer, however, that it is not less than fifteen years, and therefore the injurious effects of this excessive killing begun in any given year and continued indefinitely would not be seen within ten years at least.

This is only a hypothetical case, but it shows what is meant by too close killing of males in filling the quota. The killing of males, which would produce immediate and disastrous results, must strike at the adult males. To destroy this class or any considerable number of them would at once weaken the herd. But there would be no object in such killing, and it has never been thought of.

SUCH KILLING NOT PRACTICABLE.

In the hypothetical case above cited we have supposed that every male of a given age could be taken. While in theory this is possible, in practice it could probably never be done. There are certain hauling grounds, such as Lagoon, Zapadni Head, Otter Island, Sivutch Rock, and Southwest Point, from which the seals are not and have never been driven. The young males frequenting these are left undisturbed, and it is safe to suppose that the majority of them pass killable age before the sexual instinct draws them to the vicinity of the rookeries from which seals are driven. Furthermore, there are always little pods of bachelors in the turns and corners of the rookeries which either can not be reached or are too insignificant in number to be followed up.

OTTER ISLAND NOT DRIVEN.

Otter Island, one of these hauling grounds from which seals are never killed, must have been a source of reserve male life throughout the history of the herd. From the records in the log of St. Paul of the days when a guard was stationed there to prevent raids, we know that anywhere from two to ten thousand bachelors hauled out there regularly. During the past summer at least 1,000 young males were found at the time the island was visited. There were also from 500 to 800 males of this sort on Sivutch Rock at the time of its inspection in 1897. These young males are not disturbed, and from these hauling grounds alone an adequate supply of reserve male life might be expected to-day if none whatever escaped otherwise. In the earlier days when the herd was larger their yield was also larger.

DEFECTIVE SKINS.

One other matter in this connection is worth mentioning. From the killing field at every killing a considerable number of young males, otherwise strong and vigorous, are rejected because of some defect in the skin, chiefly bites or scars of imperfectly healed wounds. These males go to swell the quota of reserve male life.

OVERKILLING OF MALES HAS NOT OCCURRED.

So far we have considered the possibility of too close killing of males. Let us examine the facts in the case. At the time the herd came into the possession of the United States it was in a prosperous condition, probably increasing, and it maintained a maximum condition of expansion for a number of years. We need therefore not go back of the transfer of the rookeries to the United States in considering the causes of decline.

From the year 1871 a nominal quota of 100,000 male seals was taken each year to and including 1889. Since 1889 the quota has fluctuated as a result of various causes. To and including the year 1890 there were killed, in addition to the normal quota each year for food for the natives, from 3,000 to 5,000 male pups. There was further a large killing of males for food in the stagy season and of animals too young to furnish skins of the desired grade for the quota. Since 1890 the killing of pups has been stopped, as also the killing of stagy seals.

STATISTICS OF THE QUOTA.

The annual killing of male life on the fur-seal islands during the period of the first lease we find has averaged about 105,000 per year. The following table gives the total killings of males for all purposes whatsoever for the period in question:

Land killing, 1870–1889.

Year.	Land killing.	Year.	Land killing.	Year.	Land killing.	Year.	Land killing.
1870......	23,773	1875......	106,460	1880......	105,718	1885......	105,024
1871......	102,960	1876......	94,657	1881......	105,063	1886......	104,521
1872......	108,819	1877......	84,310	1882......	99,812	1887......	105,760
1873......	109,177	1878......	109,323	1883......	79,509	1888......	103,304
1874......	110,585	1879......	110,411	1884......	105,434	1889......	102,617

VOLUNTARY REDUCTION OF QUOTA IN 1876–77.

From an examination of this table we find that between the years 1871 and 1875, inclusive, an average of 107,500 male seals were annually killed on the islands. In 1876–77 this average was reduced to 88,500. Some question had been raised by Captain Bryant,[1] then agent in charge of the islands, as to the effect of the killing of this full quota. He had even recommended that it be reduced. This may have influenced the contraction in the quota, but it was not insisted upon by the Government and was voluntary on the part of the lessees. The fact that in 1878 killing was resumed and continued at an average of 105,000 for four years shows clearly enough that the alarm about the quota felt by Captain Bryant was without foundation. The temporary reduction for the two years could not have influenced the herd. But in these two years we have a right to assume that at least 38,000 young males of the age of 3 years were allowed to escape and grow up as an addition to the reserve of bulls.

VOLUNTARY REDUCTION IN 1882–83.

In 1882 and 1883 we find a similar reduction to 88,700 of the quota of male life from the preceding average of 105,000. This contraction was, as we know, purely voluntary on the part of the lessees and due to the overstocked condition of the seal-skin market. That it was not due to any scarcity of seals is clearly enough shown by the fact that the killing was in 1884 resumed and continued at an average of 104,400 until the year 1889.

The point we wish to make clear is that the 38,000 males in this first extraordinary reservation made in 1876–77, 3 years old at the time, were 7 years old, or ready for harem duty in 1880–81, and 10 years of age, or in their breeding prime in 1885–86, when the decline in the herd was well begun. Likewise, the second reservation of 32,800 young bulls was ready to replenish the rookeries in 1886–87, and they were still in their prime in 1889 and subsequent years when the decline was in the height.

NO DEARTH OF MALE LIFE.

That the young male life represented by these annual killings from 1871 to 1889 should have been produced upon these rookeries is in itself abundant proof that there was no dearth of breeding males. In its prime 25,000 bulls were ample for the needs of the heard. By the extraordinary reservations of male life which we have just noted more than sufficient bulls were supplied to the rookeries from and after 1880 to meet their needs. This was in addition to the regular reservations which were made from year to year and, further, in addition to those which escaped naturally on hauling grounds not driven.

---

[1] See extracts from the log of St. Paul, Pt. II, under date of June 10, July 25, August 4, etc., 1875.

In the history of this period, as recorded in the log of St. Paul Island, there is nothing to show that the breeding grounds were not amply stocked with bulls, and on the killing grounds systematic provision was made for the necessary reserve of male life.

KILLING OF MALES NOT A FACTOR IN DECLINE.

When we consider all these things in connection with the difficulties which we have shown to stand in the way even of a deliberate attempt to kill too closely, we believe ourselves fully justified in asserting that land killing has not, through too close killing of the males, been a factor in the decline of the herd.

PREMATURE KILLING.

It remains to be noted that there is another class of close killing which, while it does not injuriously affect the herd as a whole, produces effects which are unfortunate and which may appear to be harmful although they are not so.

We have said that from 1884 to 1889 an average of 104,400 male seals were killed on the islands each year. This would seem to indicate a normal condition of the herd, while as a matter of fact we know that during this period the herd was rapidly declining, and the immediate drop from 100,000 skins in 1889 to 21,000 in 1890 proves it.

ANTICIPATION OF QUOTA.

To understand how this killing could be thus maintained it is only necessary to remember that the quota of killable, or nominally 3-year-old seals, is culled from a herd of bachelors which contains also the quota of two subsequent years as 2-year-olds and yearlings. When in 1885 the killable seals began to gradually become scarce upon the hauling grounds, it at first became necessary to drive oftener, to include more hauling grounds, and finally to increase the period of driving. This matter can be made clear by the following table:

Table showing date of filling quota, number of hauling grounds and drives, St. Paul Island.

Year.	Date quota filled.[1]	Hauling grounds driven.[2]	Number of drives.[2]
1880	July 17	78	38
1881	July 20	99	34
1882	July 20	86	36
1883	July 19	81	39
1884	July 21	101	42
1885	July 27	106	63
1886	July 26	117	74
1887	July 24	101	66
1888	July 27	102	73
1889	July 31	110	74

[1] Date at which last regular drive for the quota was made.

[2] Several hauling grounds are included in a single drive; as, for example, Tolstoi, Middle Hill, and English Bay are regularly included in one drive.

THE KILLING OF UNDERSIZED SEALS.

For a time these more vigorous methods had the desired effect, but the scarcity of bachelors as a result of the decreasing birth rate made it necessary finally to lower the age for killable seals so as to include first the 2-year-olds and in the end many of the larger yearlings,[1] in order to secure the requisite 100,000 skins. By these methods it happened, in 1889, that practically the whole bachelor herd of four years and under, down to the yearlings, was wiped out. The result was the abnormal drop to 21,000 in the quota of 1890.

SUCH KILLING DID NOT INJURE THE HERD.

It is evident, however, that this sort of killing is not inimical to the breeding herd. It simply destroys the superfluous bachelors through premature killing. It is an anticipation in the quota of one year of the product of the next. That even the close killing of 1889 did not endanger the herd is clearly shown in that it was possible to secure, in 1890, 21,000 seals of killable age. This fact alone shows that in the nature of things it is impossible to get all the males of a certain age in any given year. That there were 21,000 seals which were of killable age in 1890 may be taken as showing, indirectly at least, that, in like manner, other older bachelors escaped, which, in the interval between 1889 and 1890, had passed to the "wigged" stage, where they were no longer suitable for the quota. Of this class Mr. Elliott records in his 1890 report the turning back of 1,112 from a part of the killings of that year.

PREMATURE KILLING WASTEFUL, BUT NOT INJURIOUS.

It is not the intention here to justify the methods of killing employed in the closing years of the lease of the Alaska Commercial Company. Such killing ought never to have been allowed. It would not have occurred had not the termination of the lease been approaching, as it would have been wholly against the interest of the lessees. But it is not conceivable that such killing could ever affect the life of the herd, as it would necessarily bring to ruin the business of taking seal skins on land long before it could produce any effect on the breeding herd.

KILLING OF PUPS WASTEFUL.

Nor can the wasteful practice of killing pups for food and killing seals when stagy, which unnecessarily augmented the draft on the male life of the herd, be passed over without condemnation. The magnitude of this waste may be inferred from the following synopsis taken from the records:[2]

Seals killed whose skins were wasted, 1871-1890.

Pups (for food)	95,628
Food skins (rejected)	27,790
Bachelor skins (rejected)	30,798
Total	154,216

---

[1] Letter of Dr. McIntyre, Senate Doc. 137, Pt. I, p. 345.

[2] See Appendix I.

ABSENCE OF INJURY TO THE HERD.

This condemnation, however, must rest solely on the basis of the waste involved. It resulted in no injury to the herd because there were still enough males, and to spare. In spite of the unnecessary draft on its male life, and in spite of the premature gathering of its product in the closing years of the old lease, the male life needed for the breeding herd never failed. The breeding grounds are to-day grossly overstocked with adult breeding bulls which can not be less than 8 years of age, and many of them must be older, their birth dating from the very period when the closest killing took place. In addition to these the rookeries are being flooded by a swarm of younger bulls as a result of the partial suspension of killing under the modus vivendi of 1891–93.

METHODS ON THE COMMANDER ISLANDS.

Over the whole subject of land killing, as conducted on the Pribilof Islands, a flood of light is thrown by a comparison with the methods in vogue on the Commander Islands. On Bering Island, for some years past, no killable bachelors have been spared, and the proportionate number of bulls is very far below what it has been under the closest killing on St. Paul and St. George. On Poludinnoye (South) rookery, Bering Island, for example, there were in 1895 five bulls, in 1896 three bulls, for between 500 and 1,000 females. Yet this number, assisted, doubtless, by immature bulls, has been shown to be entirely adequate for the impregnation of all the females. According to Mr. Barrett-Hamilton of the British commission, so far as could be seen, every cow on this rookery had a pup in 1896. This observation was confirmed by Dr. Stejneger and Captain Moser, who visited the rookery at about the same time.

DR. STEJNEGER'S OBSERVATIONS.

In his report for 1895,[1] Dr. Stejneger observes:

> On that rookery (Poludinnoye) the disproportion between the two sexes was excessive in 1895. According to reliable information, the number of bulls on the whole rookery did not exceed five. Judging from what I saw of this rookery during two visits, I should place the number of breeding females at about 600, possibly only 500.[2] It would be a comparatively easy matter to observe this year (1896) whether the number of pups born be very markedly small in proportion to the number of females hauling out.

THE DEARTH OF MALE LIFE ON BERING ISLAND.

For the three bulls which had charge of the 600 or more cows on South rookery, Bering Island, in 1896, Dr. Stejneger found in 1897, by actual count, 526 pups. Considering the proportion of seals which must have died during the winter of old age, and those which were taken by pelagic sealers, this birth rate shows clearly enough the capacity of the three bulls. For this rookery, which in 1897 contained at least 526 cows, there were but two adult bulls and a young half bull.

Such reckless killing as that practiced on the Commander rookeries is by no means to be commended nor to be imitated, but in the face of the absence of injurious results from it, it becomes impossible to charge against the more moderate and conservative killing of the Pribilof Islands any share of responsibility for the decline of the herd breeding upon their shores.

---

[1] Russian Fur Seal Islands, 1895, p. 64.

[2] Dr. Stejneger's estimate of 500 to 600 cows was made under the supposition that the cows seen on the rookery represented practically all belonging to it. It was not until 1896 that it was discovered that not over half the cows are present at one time.

THE ANIMAL DRIVEN.

If we suppose that any rejected seal is driven fifteen times in five years we have made a liberal estimate. This means an average of 15 miles of land travel for each animal, for the drives on the islands do not average more than a mile in length. The seals, as we have already seen in the description of the drive, are allowed to take their own time and rest frequently on the journey. The animal, moreover, is not ill adapted to land travel. It is not a fish, but a bear which has become adapted to life in the water. It can and does voluntarily climb cliffs which a man would find difficulty in scaling. It makes considerable journeys of its own accord. When on its hauling grounds, it is constantly in motion, pitted against its fellows in contests requiring violent exertion. On its migrations it is capable of swimming thousands upon thousands of miles and buffeting the storms of an unusually tempestuous sea. Such is the animal which is supposed to be fatally, or at least permanently, injured by an average of 3 miles of land travel annually in five years. The conclusion is preposterous.

THE THEORY INTANGIBLE.

When we come to scrutinize Mr. Elliott's theory, we can not find a tangible bit of evidence to support it. There was no dearth of bulls in 1890. He found 12,000 bulls on the rookeries, with more to spare idle on the sand beaches. This was a number entirely adequate to the needs of the herd. The presence of idle bulls showed there were more than enough. It is true he asserts that the bulls were impotent. Why they should seek the rookeries in this condition is not explained. Furthermore, Mr. Elliott has not, in support of this charge of impotency, recorded the dissection of a single animal, the only way by which the fact of impotency could be ascertained.

Mr. Elliott declares that no fresh male life existed in reserve to replenish this wornout stock. In the face of this statement he records, however, in his data for the killings he witnessed, the rejection of more than 1,100 young half bulls, which are just the class he says does not exist. He lays great stress upon the strain and exertion which the few miles of land travel produces in the driven seal, and asserts that practically none of them survive it. Of the thousands rejected under his eyes on the killing grounds in 1890, he records but a single instance of death resulting from this cause, and inasmuch as no autopsy examination is recorded, we have only his opinion in the matter and must dissent from it.

When we attempt to fit this theory of overdriving to the conditions during the period prior to 1890, we meet with no great success. That the driving in these years did not kill the 2 and 1 year old animals driven is shown by the fact that these seals appeared each year as 3-year-olds to be driven. From the younger males so released each year and from these alone could the killable seals of subsequent years come. That the bulls serving the rookeries in these years were not impotent is shown by the number of young males which the hauling grounds were able to supply. The thousands of yearlings which he has recorded as turned back from the killing grounds in 1890 show clearly enough that the bulls were not impotent in 1888. Subsequent events show as clearly that the bulls he saw in 1890 were not impotent.

ITS LOGICAL CONCLUSION.

This contention as to the effects of overdriving, pushed to its logical conclusion, means that animals are killed by it which persist in appearing afterwards distinctly alive; others are rendered impotent which are yet able to fill the rookeries with pups. The whole matter is too absurd for serious consideration, and might be passed by with the silent contempt it deserves were it not for the fact that it was accepted by the British commissioners in 1891 and made the chief foundation of the British contention before the Paris Tribunal of Arbitration.

In view of this fact, it has seemed necessary to give more attention to the theory than it deserves.

THE DRIVES AND DRIVEWAYS.

As other effects than those contemplated by Mr. Elliott's theory, for example, the driving of the animals away from their breeding haunts, the stampeding of the breeding rookeries, etc., have been associated with the methods of handling the seals on land, it will be useful for us to consider the subject in detail as it came under our observation during the past two seasons. We have already given an account of the process of driving.

At the outset it is well to contrast the driving of the present time with that of the past.

THE RUSSIAN DRIVES.

In the early Russian days the drives were all long and tedious. On St. Paul, everything was brought to the village, at the extreme southern end of the island. Thus the seals from Northeast Point had to travel a distance of about 12 miles; those from Polovina and Zapadni, respectively, 5 and 6 miles. On St. George Island the seals were driven over the rocky ridge from Zapadni, a distance of about 6 miles.

Days and nights were occupied in these long drives. The seals were allowed to take their own time, resting frequently, the natives watching and guarding them in relays. Of the time taken by the drives from Northeast Point in the Russian days we have no record, but in the year 1888, in January, according to the log of St. Paul Island,[1] a food drive of 500 seals was made to the village from this point, and it gives us some idea of what such a drive meant.

THE DRIVE FROM NORTHEAST POINT.

The seals were driven in in two sections, the time on the road being, respectively, eighty-two and one hundred hours. No deaths are reported to have occurred. The instructions to the men were to be "careful and go slow, if it took a week, and to kill and bring in all that perished on the way." The seals are reported as arriving in good condition. Drives of sea lions have in recent years also been brought from Northeast Point to the village.

THE AMERICAN DRIVES.

Under American control the long drives were done away with. Salt houses were established at Northeast Point, at Polovina, at Zapadni of St. Paul, and one had already been established at Zapadni of St. George in 1868. The seals on these rookeries are to-day killed near the hauling grounds, and their skins are salted and cared for there. From Northeast Point the skins are loaded directly on the vessel. From Zapadni of St. George they are packed across the island by the natives on their backs.

---

[1] See extracts from the log, Pt. II, date of January 20, 1888.

THE DRIVES GREATLY SHORTENED.

The drives have been still further shortened by the location of new killing grounds still nearer to the rookeries, and to-day the longest drive on St. Paul is not over a mile in length, while several are less than half a mile. On St. George, except in the case of Zapadni, the drives are the same as in the old days, everything being brought to the village. North rookery, however, is within half a mile of the village killing ground, and this is the largest of the rookeries. From Staraya Artel and from East rookeries the drives follow a course upward of 2½ miles in length in opposite directions from the village. On these driveways there are marshy places and occasional ponds of fresh water in which the seals are allowed to cool off. These drives, therefore, though long, are easier than shorter drives would be under ordinary conditions.

REEF DRIVEWAY.

The Reef drive on St. Paul, though only about a mile in length, is in fact the hardest of the drives. It contains all the different conditions to be met with on any of the drives, and therefore a detailed description of its course will answer for the rest.

Reef drive begins at the very point of Reef peninsula. The hauling ground of Reef rookery lies in the rear of the central portion of the breeding ground in a hollow between two rocky ridges, one dividing it from the rookery itself and the other leading up to the flat ground of the "parade ground." The hauling ground has four runways connecting it with the sea. From the heads of these runways and from the central portion of the hauling ground the straggling bands of bachelors are gathered up and driven to the flat of the parade ground above. Here on the level the different groups are united in one great pod.

THE CHARACTER OF THE ROUTE.

After the drive is formed the first 90 yards of its course lies over practically level ground, sloping very gradually toward the east, the direction to be taken. Toward the end of this first section the ground becomes strewn with large bowlders, sufficiently far apart, however, to offer no obstructions to the seals.

The course then leads out into a level, grassy plain, 325 yards in length, with a scarcely perceptible slope to the east. The ground is level, free from stones, and the damp seal grass makes going easy. In this plain the larger drove of seals is usually divided into two smaller ones for convenience in driving.

Beyond the grassy plain is a bowlder-covered area, the rocks imbedded in the soil, flat and worn smooth. This area was once hauling ground, perhaps breeding territory in the palmy days of the herd. Between the stones are patches of yellow seal grass. At the ridge, about midway in this rocky stretch, the course is narrowed by piles of rocks, traces of the original cliff which formed the ridge. In this narrowed passage there is a tendency to crowd, due to the desire of the seals to go in a mass wherever they go. The whole length of this rocky area is about 262 yards.

From the rocks the driveway leads up a gentle sand slope to a plain lying between two rows of grass-grown sand dunes. This plain is 400 yards in length and furnishes very easy going for the seals. Its surface is covered with a heavy growth of rye grass, which is always wet with rain or dew, and serves to cool off the seals.

At the end of the grassy plain the course drops down over a short ledge of rocks, some 3 feet in height, to a bowlder-covered area of about 200 yards in extent. This area at first level falls in a gentle slope at the end to the level of Zoltoi sands. The bowlders are large, smooth, and flat, and the interspaces are filled with lava sand.

Along the 400 yards of level sand beach is the hardest part of the drive. The seals slip and sink in the loose sand. They do not mind the rocky and grass-grown areas, but the sand worries them. This sandy area leads by a narrow passage, lined on either side by sand dunes, to the grassy plain between East Landing and the little pond at the foot of the village. This is the village killing ground.

THE LENGTH OF THE DRIVE

The total length of Reef drive as paced off is about 5,031 feet. Its greatest elevation is not over 75 feet, and the slopes are very gentle. The drive is usually made in about two hours. In the preceding pages is given a detailed account of a drive over this course witnessed on July 15.

On none of the other drives of Pribilof Islands are there rocky areas such as those described on the Reef. On Tolstoi and Middle Hill are short stretches of sand, but they are of limited extent. With these exceptions, the driveways on St. Paul are comparatively level and grassy throughout. The same is true for the long drives of St. George.

COMPARISON OF DRIVES

It is only necessary to contrast this drive from Reef, the longest and hardest on St. Paul Island, though less than a mile in length, with the 12 miles which the seals were forced to travel from Northeast Point in Russian times, or with the 5 and 6 miles of travel from Zapadni and Polovina of St. Paul, and Zapadni of St. George. That no injury resulted to the seals from these early drives is clear from the condition in which the herd was when it came into the possession of the United States.

THE COMMANDER DRIVEWAYS

To appreciate the ease of the Pribilof Islands drives it is only necessary to contrast them with those of the Commander Islands. The following description of the driveways of Medni Island is quoted from Dr. Jordan's record in the Journal for August 25, 1896:

> *Zapadni driveway.*—The drive from Zapadni goes up from the stony beach between two towers of rocks, climbing the gorge of a little brook which cuts into the bowlders and clay of the hillside, an excessively hard, rough little gully, very difficult for a man to climb, there being small cascades and wet clay in its course. The way is marked by road skeletons. After an ascent over ground of this sort for 300 or 400 feet, more or less, the drive goes up through steep, grassy slopes, some of them of soft clay, somewhat cut into rough steps by men's boots. The general character of the ground is unrelieved, although more or less broken by cross gullies and ridges. The final ridge is 760 feet above the sea. On the Glinka side is a long slope, at first quite steep, everywhere grassy, and rather easy, but marked with road skeletons, as it is very long. The rye grass grows rather longer below, and a little stream has deep depressions, which serve as death traps, as the skeletons show, when the seals fall in piles one over another. Above Glinka is a steep slide of yellow clay, from which the village is said to have received its name. This slide must be a hard place for the seals. The seals (few in number) that are released because too young or too old are allowed to go down to the sea, whence they go back to the west again.

Palata driveway.—The drive from Palata is now rarely made, as the seals have grown so few. They are killed all along the beach, and the myriads of flies about the decaying carcasses must be the source of great annoyance to the breeding seals. The drive ascends from the parade ground on the top of the landslide. This was formerly occupied by bachelors, but there are no separate droves of bachelors now. They are scattered in little clumps about and between the rookeries. The drive then for about 100 feet ascends a grassy cliff so steep that steps have been dug in it to facilitate climbing. Then follows some 700 feet of irregular but very steep slope, in which the easiest depressions are sought, though the hill is everywhere about as steep as a man can climb, and one who goes up it must cling to the grass. Above this slope the drive reaches the back of the knife-like ridge that separates Palata from Zapalata. This widens out into an easy, level plateau for about 20 rods, marked with road skeletons. The elevation is about 850 feet by Dr. Stejneger's map. Then follows a steep climb up gravel and clay, with scanty grass and heather, worn into steps, the driveway bounded on the southwest by a slanting precipice that lies above Sabatcha Dira. A steep shoulder of heather and small plants is followed by a final climb into the clouds to the summit of the pass, 1,220 feet above the sea. From the summit an abrupt descent leads down a distance of about 500 feet by a zigzag trail as steep as a horse could pass over, strewn with gravel and covered with low flowers, to the bed of a swift little brook. This stream flows down into a grassy basin, the slopes becoming less and less steep, the rye grass and putchki growing taller. At the junction of this stream, flowing into the little brook from the west, the drive merges into the one from Zapadni. The drive from Palata is not in any place so difficult as the gully just above Zapadni, but it is half higher and twice as long, a trip one could not take on horseback, nor would it be easy to lead a horse over it. Comparing it with conditions on St. Paul, the Palata Pass is as steep as the cone of Bogoslof, twice as high, and is without water. Compared with the severest drive on St. Paul, it would stand as the ascent of Mount Blanc to a walk in the park. It is a very fatiguing trip for a man. It took me, walking rapidly, thirty-eight minutes (deducting stops) from Palata to the grassy level, 860 feet; thence twenty-eight minutes to the top, 1,220 feet; fifteen minutes down the upper slope, and fifteen more to Glinka.

NO EVIL RESULTS FROM THESE DRIVES.

And yet, notwithstanding the severity of the drives of the Commander Islands, no harm has resulted to the breeding herds of these islands which can be traced to this cause.

CARE EXERCISED IN DRIVING.

Many drives were witnessed during the past two summers on St. Paul Island. In connection with none of them was seen warrant for the harrowing tales of animals dying of exhaustion and fright by the wayside or smothering under the feet of their terrified companions. In the drive of July 15, numbering 1,500 seals, from the Reef not a seal fell by the way or showed signs of dangerous exhaustion. Many were plainly fatigued by the journey, and when allowed to rest sprawled out panting on the ground. But after resting, when the drive was ready to move on, they were ready and able to go with it.

THE FUR SEAL NOT ILL ADAPTED TO LAND TRAVEL.

The fur seal's only difficulty in land traveling is the inconvenience occasioned by its thick blanket of blubber. In the water and in a moist cool atmosphere this does not trouble it. But under the action of dry hot air it experiences great difficulty in making the least exertion. Combined with all this is the fact that the great oar-like feet of the seal make it clumsy, and undoubtedly its muscles become tired quickly under the unwonted exercise of walking instead of swimming.

When a seal becomes exhausted and is unable to continue the journey it is killed on the spot. This is not because the animal is necessarily permanently injured. If left to recover it would doubtless make its way to the sea. But to save time and avoid possible loss of the skin the animal is at once killed and skinned, the pelt being brought in by the drivers. These skins are called "road" skins and the carcasses left to be eaten by the foxes soon become the "road skeletons" of which so much has been said.

THE "CARCASS-STREWN" DRIVEWAYS.

So much had been said about the carcass-strewn driveways that it seemed worth while to verify or disprove the matter by personal observation. Accordingly, after the killing season of 1896 was over, each and every one of the driveways of St. Paul Island were traversed and closely inspected. Two skeletons were found on the Reef; two others were found in the course of a small food drive, brought over from Lukanin to the salt house at the foot of the cove. This latter drive was evidently carelessly made, as its small size and the short distance made any casualties unnecessary. The deaths on Reef driveway each occurred on separate drives, and neither occurred on the drive witnessed on July 15. On none of the other driveways were skeletons found. Scattered bones were found here and there, but these were common to all parts of the islands in the vicinity of killing grounds, having been carried away by the foxes. Four deaths are therefore known to have occurred on the drives of St. Paul Island during the season of 1896, which aggregated 24,000 animals killed, besides many driven up but rejected as of unsuitable age. It is safe to say that in the handling of no similar body of animals, of no matter what kind, would a smaller percentage of deaths by accident occur. Moreover in the few cases involved the animals were at once relieved from suffering, and their skins were saved.

FATALITIES ON THE DRIVES.

During the season of 1897 a much greater proportion of accidents occurred on the drives, the number of seals dying probably reaching a total of 25 out of about 20,000. This was due in large measure to the unfavorable weather of this season. At times the sun came out warm and occasioned considerable suffering among the animals driven. In the books of the islands is kept a record of the skins of animals dying on the drives. The list is a small one. Of the 21,000 seals killed on the two islands in the year 1890, only 11 are recorded as dying by the wayside. This moreover is the year and the driving on which Mr. Elliott has based his theory of the evil effects of overdriving.

INJURIES TO BACHELORS COULD NOT AFFECT THE HERD.

But even if the young males were driven to death on the driveways it would not affect the herd of fur seals any more than the slaughter of steers would affect a herd of cattle. It would be cruel and inhuman to do it, but the responsibility would rest with the person doing the driving, and the evil effect would end with the life of the animal so tortured. If the animal as a result of the ordeal of driving goes back weakened in physical strength and vigor, it either recovers from such injury or dies, if not at once, then in the next migration. No seal physically injured in any serious manner survives the harsh sifting process of the northern winter, which sends back only those perfect in every way and fit to survive. We may therefore assume that if a seal returns to the hauling grounds the next spring, he has fully recovered and is physically able to repeat his experiences.

THE IMPOSSIBILITY OF SEXUAL INJURY.

There remains, then, but one further point, namely, the possibility of the male seal becoming sexually injured as a result of driving while still retaining his physical vigor. The organs of generation in the male fur seal are carried like those of the dog or similar animals, and owing to the peculiar character of the hind legs of the seal they appear to be in an exposed and dangerous position. It would seem as if the testes must come in actual contact with the ground when the animal is in motion. A hasty observation might lead to the supposition that to force an animal in this condition to travel several miles over rocks and stones would produce direct injury to these organs. Whether or not this is the source of Mr. Elliott's theory of the impairment of the virility of the bulls through overdriving we do not know, but if this did not suggest the theory it is hard to understand what did.

VOLUNTARY MOVEMENTS OF THE MALES.

The violent voluntary movements of the adult bulls on the rocky floors of their breeding grounds would be sufficient answer to this contention. No efforts required of the seals on the drives are any harder than those they undergo of their own accord. But without relying upon this, the investigations of the past two seasons show that the testes of the male seal are under direct control of the animal, and when he is in motion are drawn up into the body, where they are absolutely protected.[1] Thus there is no possibility for direct injury to the generative organs of the male from driving.

DRIVING NOT A FACTOR IN THE DECLINE.

Therefore, after a full consideration of the subject of driving in all its bearings, we are inevitably brought to the conclusion that it is not and has not been a factor in the decline of the herd. It would be possible under thoughtless or unfeeling management to make the operation the source of great physical suffering to the animals concerned, and the driving should be, as it evidently is, always under humane and intelligent supervision. The interests of the herd, however, are not concerned in the presence or absence of such care. The treatment of the bachelors on the drives and killing grounds of St. Paul Island no more affects the breeding rookeries than would inhuman treatment of horses on the street-car lines of San Francisco affect the breeding herd of the Palo Alto stock farm.

It is not necessary for us to consider certain alleged sources of injury to the herd through stampedes occasioned by fright on the rookeries or through raids by seal poachers. These and many other more or less imaginary causes of injury to the herd were used to support and strengthen the main contention of the British case before the Paris Arbitration that land killing was the cause of decline. But these causes, if they ever actually existed, could produce only temporary results, as they were themselves necessarily temporary in their nature and action. The decline of the herd, to whatever it may be due, has been constant, and for it must be sought a permanent cause.

---

[1] See observations in the Daily Journal under date of October 11 and 19, 1897.

CHAPTER X.

ALLEGED POSSIBLE CHANGE OF HABITS.

MIGRATION TO COMMANDER ISLANDS.

It may be worth while here to note certain supposed possible changes of habits on the part of the fur seals as a result of the interference of man. Much has been said at the Paris Tribunal and elsewhere regarding the danger of driving the seals from their haunts on the Pribilof Islands to seek other shores. There is no such possibility.

It has been a tradition in the history of the fur seals that the Commander Islands were originally occupied by seals which had abandoned the Pribilof Islands. This tradition has not the slighest foundation. Doubtless all came centuries ago from one parent stock, but as the two herds exist to-day they are distinct races or species and do not intermingle in any way. Notwithstanding this, it has within recent times been thought possible that under exceptional circumstances we might expect an exodus of seals from the Pribilof Islands to the Russian islands. Even so late as the present year it has been asserted that Pribilof seals were taken on the Asiatic side, the alleged cause of their going there being the fact that they had been branded on their native rookeries. These stories are all very absurd and rest upon no basis of fact or knowledge, but, in view of the persistency with which they have been urged, it will not be out of place to consider the habits of the animals in the light of such possible results.

THE FIXED HABITS OF THE SEALS.

The habits of the fur seal are strongly fixed. From the natural ruthless destruction of all seals in which the geographical instinct or the instincts of feeding and reproduction are defective results the extreme perfection of the few instincts which the animal possesses. The life processes of the fur seal are as perfect as clockwork, but its grade of intelligence is low. Its range of choice in action is very slight. It is a wonderful automaton, and the stress of the migrations will always keep it so.

THE SEAL'S LOW INTELLIGENCE.

By intellect or intelligence in this sense is meant the power to choose among different possible courses of action. External influences and internal impulses produce certain impressions on the nervous system of the animal. By the automatic instinct the response which follows is directly related to the cause, and there is no choice among responses. So much influence, so much rebound. By the operations of instinct each individual in given conditions will act just as any other individual will. Intellect, however, implies individuality. One animal will choose to do this, another that, adapting action to certain needs and circumstances. A fur seal will do what its ancestors have had to do to perfection. If he is forced to do anything else he is dazed and stupid.

As a result of all this the habits of the fur seal are fixed and immutable. No better illustration of this can be cited than the fact that after having been driven from their hauling ground, culled over, and subjected to the excitement of the killing grounds, bachelors have been known to return quietly and take up their places on these same hauling grounds as if nothing had happened. During the past two seasons seals have been repeatedly watched as they were released from the killing ground at the village, swim away directly through Zoltoi Bay, round Reef Point, and haul out on the hauling ground of Reef rookery from which they had been driven perhaps three hours before. And this thing goes on throughout the season and has been going on for half a century. The seals have no remembrance of past events. Once in the water they are solely governed by the instinct which leads them to haul out at the particular point where they are accustomed to rest. That they have been so recently disturbed there is merely an incident of which they remember nothing.

CONTACT WITH MAN HAS HAD NO EFFECT.

The fur seals on the Pribilof Islands have been constantly in contact with men during more than a century. At times, in its early history, the herd has come near annihilation as a result of man's rapacity and improvidence. But neither this nor the more systematic and reasonable treatment which has been accorded them in recent years has affected in the least the habits of the animals. So far as we know, the fur seals of a century and a half ago did exactly what their descendants of to-day are doing. There is nothing in present conditions nor in the conditions of the past to warrant the assumption that in the future they will cease to do the same thing.

At the approach of winter they depart on their migrations. With the returning spring they unfailingly arrive class by class and go through the routine of their daily life. There is no evidence that any phase of their life activity has changed since man found them. None have been found to seek other shores. It is probably not possible for man to drive them from their breeding haunts. Their rookeries are their home, and to them they will return so long as they live.

ALTERATION OF CONDITIONS.

Some slight alteration in the conditions of life among the fur seals have necessarily resulted from the interference of man. Land killing has lessened the number of bulls, reducing their turbulence. In the natural state of the animals, when the adult males were practically equal in number to the females the fighting among them must have been something terrific. To-day, when the adult bulls are only about one-thirtieth of the number of females, the amount of fighting indulged in is sufficient to show that the male fur seal has lost none of his belligerent qualities.

THE BACHELORS OF BERING ISLAND.

From the excessively close killing of the males on the Russian islands, a curious result has been brought about. On North rookery of Bering Island, for a number of years, every male that could be found had been killed. As a result, there were in 1895 not more than 6 adult bulls to a herd of about 1,000 breeding females. On this rookery the bachelors were found to occupy places among the breeding seals instead of hauling by themselves, as under normal conditions. In this, however, we are not to assume a change of habit. It is the instinct of the male to seek the breeding ground. On his return as a yearling force of habit draws him there. As he grows older sexual instinct exerts its influence. Eventually, if he is not killed, he arrives at the age when his strength enables him to win a place and rule a harem of his own.

It may therefore be said that the natural habit of the bachelor is to get on the breeding ground or as near it as possible, the fear of the bull alone keeping him away. And he has good reason to stand in dread of the harem master. At the close of the breeding season, as soon as the old males go away to feed, the bachelors scatter over the rookeries and enjoy their new found freedom until the bulls return. If the bulls were allowed to increase on Bering Island, they would certainly drive out the bachelors and restore the normal conditions.

ARBITRARY SELECTION OF MALES.

There is not the slightest evidence that the race of fur seals as a whole has been in any way affected by the arbitrary selection of males for killing. Only strong, vigorous males can maintain themselves on the rookeries, and those allowed to live are neither more nor less vigorous than the others would have been.

Effects resulting from variations in the character of the breeding males can not be great, and would not, if they existed, make their appearances for many generations, perhaps not for centuries. Careful supervision might possibly make effective artificial selection of males, and such experiments, whether leading to practical results or not, are worth trying. But whatever may be done in the future, it is certain that the character of the herd has not been changed by the action of man in removing its superfluous male life.

It must be remembered, in this connection, that a strong selective influence is exercised by the migrations in the sea. Only the vigorous members of the herd survive the experience of winter. No decrepit individuals have been known to come back in the spring. The rough sea of the north tells no tales, and it sends back to the islands only those fit to survive.

THE EFFECT OF DECLINE.

The decline which the fur-seal herd has suffered within the past decade has so diminished its stock of breeding females that the rookeries have contracted in area and at the same time become more sparsely populated. The harems are more isolated and distinct. The bulls have more room and are farther removed from their neighbors or the idle bulls. These alterations, however, represent mere adaptation to changing conditions and are not indication of changes in the habits of life.

THE POSSIBILITY OF DRIVING THE SEALS ELSEWHERE.

Most of the dire evils charged to man's interference are vague and intangible. Before the Paris Tribunal much was urged by the British representatives about the danger of the methods of land killing driving the seals to seek other breeding haunts. But no proof was adduced of such result. Perhaps the best illustration of this class of vague possibilities is found in Mr. Elliott's monograph.[1]

The subject of how best to manage the fur-seal islands had been under discussion. In objection to the plan of the Government itself controlling the taking and selling of the seal skins Mr. Elliott, assuming that such a course would involve the sailing of

---

[1] Seal Islands of Alaska, 1881, p. 27.

"a thousand ships to be present at the sale," exclaims that "the rattling of their anchor chains and the scraping of their keels on the beaches of the two little islands would alone drive every seal away and over to the Russian grounds in a remarkably short space of time." The quality of seamanship implied in the second feature of this dire calamity is a fair indication of the value of the prophecy as a whole.

THE ABANDONMENT OF SPILKI ROOKERY.

There are, however, a few of the alleged injurious effects of contact with man which can be located and considered. One of these is the abandonment of the small breeding ground formerly occupied by seals under the cliffs behind St. Paul village. This breeding ground, though out of sight of the village, is very close to it. The claim is made by Mr. Elliott that the children and idlers from the village, by playing with the fur-seal pups and teasing them, gradually brought about the abandonment of the rookery.

The abandonment of Spilki was gradual and finally culminated in 1886. The old bulls came and took up their places, but finding no cows they withdrew. In 1872–1874 Mr. Elliott reports this breeding ground, in common with all the others, in good condition and full of seals. In 1890 he found it deserted. His conclusion was that the seals, under the annoyance of the natives, had withdrawn elsewhere.

THE PRESENCE OF THE VILLAGE NOT THE CAUSE.

It is sufficient answer to this theory to say that the village of St. Paul has existed on its present site, and consequently in the same proximity to Spilki rookery, ever since 1824. For fifty years, therefore, according to Mr. Elliott's own testimony, no ill effects on the seals had been produced by the presence of the villagers.

MORE EXPOSED CONDITION OF LAGOON ROOKERY.

In further opposition of this theory we may mention the example of Lagoon rookery, which lies just across the little cove from Spilki. It is in plain sight of the village and but little farther away from it. All the traffic of loading and unloading the ships passes before it. Moreover, this rookery existed undisturbed for years and years with the operations of the great common killing ground of the island going on within plain sight of its inmates and only a few yards away. For a time all the seals on the island of St. Paul were slaughtered on the flat beside the narrow channel of water, about one hundred feet in width, separating Lagoon rookery from the killing ground.

No clearer proof could possibly be asked than the example this rookery shows, of the utter disregard for the presence and actions of man manifested by the fur seal.

THE REAL CAUSE OF THE ABANDONMENT.

When we come to seek a more rational cause for the abandonment of Spilki rookery, it is not hard to find. The rookery was but a small one at best, as the ground it occupied was limited. Mr. Elliott ascribed to it in 1872–1874 about 275 harems and about 4,000 breeding cows. We know that as a matter of fact this estimate is largely exaggerated. The log of St. Paul Island shows that in 1879 its breeding families numbered 29. There was at that time no hint given of abandonment or unusual diminution of the rookery. With the decline of the herd, which began a few years later, and may have been begun earlier, this rookery suffered diminution with the others. In 1890 Mr. Elliott found that the herd on St. Paul had diminished to about one-fourth. A proportionate reduction for Spilki would have diminished it to less than a dozen families.

To one who understands the gregarious nature of the fur seal there is no surprise excited by the abandonment of so small a rookery as this. The conclusion is inevitable that when reduced to a mere handful of harems, the animals moved over to the larger Lagoon breeding ground across the cove.

ORIGIN OF LAGOON AND SPILKI.

We do not know which of these two rookeries was first established, but it is reasonable to suppose that the one originated as an overflow of the other, as both are limited in extent. As the rocky spit on which Lagoon rookery is established appears to be of recent formation, it may be that Spilki was the original breeding ground. But in any case the simple explanation of the abandonment of Spilki is found in its small size originally, the known fact of decrease in the herd, and the gregarious instinct of the animals. When the remnant became too small to exist as a unit, its individuals moved over to the Lagoon, to be with the crowd.

THE ABANDONMENT OF MARUNICHEN.

In further support of this, we may cite the only other example of absolute abandonment of breeding territory on the islands. On the north shore of St. Paul formerly existed a small rookery which has long since disappeared. Even the oldest inhabitant (Kerick Artimanof) merely remembers it was talked of in his childhood. His explanation that it was a small rookery and never looked upon as important gives the key to the situation. Its breeding seals abandoned their isolated position to be with the crowds on the shores of Northeast Point or Zapadni. Interference on the part of man can not be offered as a reason for its abandonment, for there is no more isolated and inaccessible place on the island.

ELLIOTT'S THEORY FOR SIVUTCH ROOKERY.

In his 1890 report Mr. Elliott explains the presence of a breeding rookery on Sivutch Rock by saying that the seals had been so harassed by the severe methods of driving employed on Reef rookery that they had sought on its surface a place where they might rest in peace. He says that prior to the beginning of the severe driving in 1882 the seals had instinctively avoided this place because of its exposed position and the probable destruction of the young by the storms which sweep over it. In short, he assumes a few seals had chosen to waive the instinct of self-preservation and to locate themselves in a dangerous position simply because of temporary annoyance.

We have already spoken of the strong instinct of the fur seal and its lack of reasoning powers. Such an explanation as this is wholly inconsistent with both. If the animal possessed any such powers of discrimination as here assumed, there would never be a second drive made from any hauling ground on the islands.

SIVUTCH OVERLOOKED IN 1872-1874.

We are inclined to believe that Mr. Elliott in 1872–1874 simply overlooked the presence of this rookery. He says nothing about it in his earlier report. In 1890 he says it did not exist then at the earlier date.[1] Inspection of this rock on several occasions during the seasons of 1896 and 1897 shows that it has probably always been occupied as a breeding ground. It is certainly well adapted as such. It is not wind swept or dangerous to breeding seals. The high ridge of Reef peninsula protects it from the northern and western storms, while Otter Island breaks the force of the storms from the southwest. Furthermore the drowning of pups by storms is one of the rarests of accidents.

The occurrence of a breeding ground on Sivutch Rock is perfectly natural. The ground is adapted for rookery purposes. It is within a few hundred yards of the shores of Reef rookery, and lies directly in the line followed by the seals in approaching it. There is no need of seeking a more complex explanation. It would be a matter of greater surprise if it did not contain a rookery.

THE NOTIONS OF THE ALEUTS.

Most of the absurd notions current regarding the seals have their origin in the minds of the Aleuts themselves. At least they possess such notions now, though originally they may have adopted them from the earlier restrictions which were once in vogue on the Pribilof Islands, and some of which are still enforced on the Commander Islands. Some of these rules are the following: The prohibition of the use of tobacco on the rookeries, of the wearing of hobnailed shoes, or of the lighting of fires when the wind was in such a direction as to carry the smoke into the vicinity of a rookery.

The Aleuts may be excused for their beliefs. Their training and experience is limited. They have had nothing to do with domestic animals, and have never had opportunity to test the theories they hold regarding the seals. It was plainly the belief of these people that direful results would follow our work of the past two seasons on the islands. One intelligent native declared that the scarcity of the seals was due to the tramping of investigators about the rookeries in recent years. Another complacently declared that the rookeries were all right, because the old bulls came back regularly and in large numbers.

THESE NOTIONS SHARED BY GOVERNMENT AGENTS.

That the fears of the natives have been shared in to a certain extent, at least, in the past and are still held by the agents in charge of the islands, is evident. Thus, we find recorded in the log of St. Paul Island, under date of June 11, 1891, the opinion that the "constant and persistent running over the rookeries of Elliott last year at this time may be charged with a large part of the falling off of seals driven." Again, under date of November 11, 1895, the opinion is recorded that the "daily scientific and photographic investigations" of the summer have demoralized the rookeries. During the season of 1897 serious objections were made to the experiments in electrical branding as conducted in the vicinity of the rookeries because of supposed injurious effects which might result from the noise of the gasoline engine, yet the animals themselves paid not the slightest attention to the engines or to the branding operations. Most of them have not even yet noted the existence of man.

---

[1] See extract from log of St. Paul, Pt. II, under date of August 18, when Captain Bryant reports many seals hauled out there.

As a result of this spirit which has pervaded the management of the rookeries the policy of the past has been virtually to keep the fur seal herd in a wild state, it being shut out from all sight or contact with man except in so far as it was necessary to disturb it to secure the product of the herd.

THE POLICY OF SECLUSION DETRIMENTAL.

This mistaken policy bore its fruit. From the time of Mr. Elliott's investigation in 1872–1874 until the collapse of the herd in 1890 the history of the rookeries is a blank, so far as any real knowledge is concerned. What was needed was a thorough and systematic study each year of the condition of the breeding herd. It is safe to say that had this been done, the error, falsehood, and confusion which so effectually stifled the truth before the Paris Tribunal of Arbitration, and caused that bewildered court to legalize pelagic sealing, would not have been possible.

Under this policy of seclusion the herd melted away to one-half of its size before it was known that any danger threatened it. Year by year thousands of the young died and rotted on the rookeries as the result of the ravages of a dangerous parasite, which should have been recognized and measures taken, if possible, to suppress it. Others of the young died of starvation on the rookeries, proclaiming not only the fact but the cause of the decline of the herd, but they were unnoticed. Had the fur-seal herd been treated as any valuable herd of animals are and should be treated, its habits, needs, possibilities, and limitations studied from year to year from the beginning, it is safe to say that there would now be no fur-seal question. For the difficulties of the situation to-day the policy which deferred to these groundless fears of what might result from examination and disturbance of the animals is in a measure, at least, responsible.

INTELLIGENT INSPECTION NOT WANTON INVASION.

It is, of course, not contended that the precautions taken against wanton invasion of the rookeries by the natives and by casual visitors are not wise and necessary. They should never be wanting, but they should never include or influence the officers in charge of the herd. We make a clear distinction between mere disturbance and intelligent inspection and supervision. It is possible to visit the rookeries daily and study them closely, to count their families and to photograph them, without disturbing the breeding seals in the least. After the breeding season is over and the harems have broken up, the rookeries can be entered, the animals driven off, and their grounds inspected without harm.

INSPECTION NOT HARMFUL.

In the work of the past two seasons it was assumed that the herd could be inspected and disturbed to any extent necessary. Whatever would throw light on its condition was unhesitatingly carried out. The breeding grounds were under constant inspection from the beginning to the end of the breeding season and until almost the departure of the animals from the islands in the fall. On all the rookeries the seals were twice driven off into the sea. They returned immediately to their places and resumed their usual routine as if never disturbed. On the rookeries most frequently visited the animals came apparently to ignore our inspection. They were manifestly less troubled by our presence than on rookeries seldom visited.

RELATIONS OF MAN HAVE NOT AFFECTED SEALS.

In short, our experience leads us to believe that not only has contact with man produced no injurious effect on the herd, but, on the contrary, more intimate and constant contact under intelligent direction would tend to render the seals more tractable, and certainly open the way to the improvement of their condition. It will never be possible to house and feed the fur seals, but their breeding grounds can be drained of the filth which now breeds death to the young. These breeding grounds can be extended and improved. An exact enumeration of their number can be made. The males to serve the breeding grounds can be selected and more closely limited, thus obviating loss of revenue on the one hand and injury to the herd on the other. In other words, much if not all that can be done with other animals is possible with the fur seal.

To sum up this matter of the relations of man to the animals on the islands: We find that the killing of males as carried on, at least since the islands were transferred to the United States, has not been so great as to endanger the breeding stock; that the methods of handling the seals on the drives and killing grounds has not been such as to permanently injure those surviving them. In a word, the interference and operations of man have in no way contributed to alteration of the life habits of the fur seal and are in no way responsible for its decline and threatened extermination.

CHAPTER XI.

PELAGIC SEALING, OR KILLING AT SEA.

THE NATURE OF PELAGIC SEALING.

We may now pass to a consideration of the second way in which man has come in contact with the fur seals, namely, by hunting and killing them at sea. Pelagic sealing, as it is called, means the taking of seals at sea, either on their migrations or on their food excursions to and from their breeding grounds. It is necessarily indiscriminate in its character, animals of both sexes and every age and condition being taken. The animals are killed both by the spear and with firearms.

THE HUNTING OF THE INDIANS.

From the earliest times the natives in the vicinity of Cape Flattery and Vancouver Island have been accustomed to hunt the fur seal in their dugout canoes, going out from shore for this purpose a distance of 10 to 30 miles. It is probable that this hunting has existed as long as Indians have occupied these regions and fur seals have annually passed their shores. The taking of the fur seals was at first doubtless associated with the hunting of the sea otter, and it has been suggested that the flesh of the seal rather than its fur was the original object of its capture.

With the decline of the sea otter and the various land furs, the skin of the fur seal came to have a value and found its way into the markets through the hands of the traders. In time the taking of fur seals became the object of special attention, and the plan was developed of transporting the Indians and their canoes to the sealing grounds by means of sailing vessels, thus enabling them to carry on their operations consecutively and over a wider area.

THE INTRODUCTION OF VESSELS.

This first use of vessels in hunting the fur seals dates from about the year 1872, and for several years the number employed was small, probably not exceeding five or six before 1879. By their means the hunters were able to reach a distance of from 75 to 100 miles from shore and to follow the herd on its northward journey to the breeding grounds. From 1879 onward the number of vessels engaged in pelagic sealing increased rapidly. In 1880 the fleet numbered 16 vessels, making another bound to 34 vessels in 1886, this second increase being due to the opening up of Bering Sea in 1883,[1] when the schooner *City of San Diego* took a catch of between 2,000 and 3,000 skins there.

THE EXPANSION OF THE INDUSTRY.

After the introduction of vessels there was a steady expansion of the territory covered by sealing operations. The fleet gradually began to go south of Cape Flattery to meet the herd before it reached that point, and the hunters followed its course from the mouth of the Columbia River to the passes of the Aleutian Islands, finally entering Bering Sea, and continuing their operations on the summer feeding grounds of the animals.

---

[1] Since this was written there has come into the possession of Mr. Charles H. Townsend the log of the schooner *San Diego* (often confused with the *City of San Diego*, another vessel), which shows that she took a catch of seals in Bering Sea in 1880. See Mr. Townsend's paper on Pelagic Sealing, in Part III.

THE USE OF FIREARMS.

Before the year 1886 Indian hunters were used exclusively, and the primitive methods of the spear and the canoe were employed. But with the great increase of the fleet it was necessary to employ white hunters, and as these could not compete with the Indians in the use of the spear, firearms were introduced, the rifle first, and afterwards the shotgun loaded with buckshot. The use of the rifle resulted in a great loss by sinking of the seals killed. The shotgun proved more effective, though many seals were still lost, especially at first, before the hunters had learned to avoid piercing the lungs.

The development of pelagic sealing in Bering Sea after 1886 was a steady growth, though the number of vessels fluctuated on account of seizures by the American authorities. In 1891 the fleet numbered 115 vessels.

THE MODUS VIVENDI.

In this year a modus vivendi was declared, closing the waters of Bering Sea to pelagic sealing. The measure was put into force too late in the season of 1891 to prevent the fleet from entering upon its work. It had, therefore, at best only a deterrent effect. As a result of being warned out of the sea, certain vessels crossed over to the Asiatic side and obtained seals there. On this account, notwithstanding the fact that the modus vivendi was renewed in 1892 and made effective, the pelagic fleet in that year was increased to 122 vessels. More vessels engaged in sealing on the Asiatic side, and in 1893, still under the modus vivendi, the bulk of the sealing was transferred to the Commander herd, 66,000 skins in all being taken from Asiatic waters.

THE REGULATIONS OF THE PARIS AWARD.

Bering Sea was opened again in 1894 under the regulations of the Paris Tribunal and the largest catch ever made in these waters was taken. Since this date sealing has continued under certain limitations, the chief of which are a closed zone of 60 miles about the islands and a closed season from the 1st of May to the 1st of August. The decline in the herd has effected a decline in pelagic sealing itself. During the season of 1897 less than half the vessels engaged in sealing in 1896 entered the sea and the catch from all sources for that season was but little more than one-half. From a fleet of nearly 100 vessels in 1894 the sealing vessels have diminished to less than 30 in 1897.

THE SEALING VESSELS.

The vessels comprising the pelagic fleet are sailing schooners ranging in size from 25 to 125 tons burden. Each vessel carries a crew of from ten to fifty men with from half a dozen to twenty boats or canoes. Boats are used where white hunters are employed. The Indians use their own canoes.

Each boat is manned by three men, two hunters, armed with rifles or shotguns or both, and a rower to manage the boat. The Indians hunt with two men in a canoe, one a steerer to manage the craft and the other the hunter to throw the spear.

METHODS OF SEALING.

When the schooner comes into sealing territory and the weather is favorable, boats or canoes are lowered and sent in search of seals. They go to the windward at slightly different angles; the vessel follows under slow sail trying to kee sight of the boats. Night or the approach of bad weather drives in the b with their catch of the day whatever it may be.

THE SEALS AS FOUND.

Seals at sea are designated in three different classes. When found in motion are called "travelers." When at rest they are called "sleepers." Sometimes res seals are awake, but listlessly floating on the water, and from the movement of t flippers they are said to be "finning."

METHODS OF CAPTURE.

THE SPEAR.

In favorable weather seals are found sleeping between the hours from 9 o'cloc the morning until 5 or 6 in the evening. In stormy weather the seals can not rest so sleep more soundly in the first good weather after a storm. Sleeping seals ar a rule taken with the spear. Mr. A. B. Alexander has given us the following gra account of the operation:[1]

> At the end of an hour we saw our first seal about a quarter of a mile ahead. The canoe kept off under its lee, the sail taken in, and everything put in readiness for action. Cautiousl paddled toward the prey, care being taken not to make the slightest noise. We approached wi about 40 feet when the seal began to grow restless, as if it was dreaming of danger. The hu stood braced, spear in hand, and with true aim he hurled it with all his force at the sleeping ob In an instant the scene of repose was changed into one of intense excitement and pain. With a j the seal instantly disappeared below the surface, but not to escape, for when once a spear bec fastened to an object it seldom pulls out. Soon it came up to breathe and renew its desp struggle for liberty. It stood in the water facing us, with its body half exposed as if taking i situation, and with a kind of low piteous growl, as though it realized its end was near, it renewe contest. It fought madly, diving, jumping, and swimming with great speed, first in one direc then in another, sometimes on one side of the canoe and then on the other, the Indian all the holding the spear rope, trying to draw the seal near the canoe so as to strike it on the head wit killing club. In its frantic efforts to escape, it bit at the line several times, but soon abandone idea of gaining its freedom in such a manner and again resorted to jumping and diving. The of blood soon caused it to grow weak, and after a fight, which lasted perhaps five minutes, it ce to struggle altogether and was hauled to the side of the canoe and dispatched with the club.

THE SHOOTING OF SEALS.

Traveling seals are taken by shooting. Sleeping seals are of course shot also, with these animals the spear is more effective since they are frequently found slee in groups. To shoot into one of these groups means the taking of but one animal, the report startles all the other seals in the vicinity. With the spear but little n is made.

Where the traveling seal is jumping clear of the water, "breaching," as it is cal the rifle is used, as the shot must be made at longer range. Where the seal is wi close range or can be approached, as when it is asleep, the shotgun discharging b shot is used. The aim is for the head or breast of the animal.

---

[1] Proc. Fur Seal Arb., Vol. 9, p. 346.

The following description of the methods of taking seals is given by Lieutenant Quinan,[1] of the revenue-cutter *Corwin*, in relating his experience in a canoe with Indian hunters off Sitka Sound, May 1, 1892.

> We had pulled several miles without seeing anything, when suddenly the steersman gave the canoe a shake and pointed in silence to a seal 75 yards distant. * * * The bowman took in his oars and substituted the paddle, and the canoe glided noiselessly toward the unconscious seal. When within 40 yards of it the after paddle alone was used and the bowman stood ready with the shotgun. * * * During all this time not a word was spoken, and so noiselessly did the canoe glide that we got within 10 yards of it and the hunter fired, pouring a charge of buckshot into its breast. The seal, to my great astonishment, was not killed, but gave us a surprised look, and instantly dived out of sight. It rose again 50 yards off, gave us another look, and a second time disappeared. Then followed a chase to windward, the Indians dexterously applying their paddles in that direction. Three times it disappeared and reappeared before it was finally shot and captured. Even then it was necessary to use the club to kill it. One hook with the gaff, a sudden pull, and the unfortunate seal was in the canoe.

LOSS RESULTING FROM SHOOTING.

It is plain that by the method of shooting a certain percentage of loss results from the wounding of animals and also from the sinking of animals before they can be recovered. That many of the wounded animals escape is shown by the considerable number of bachelors on the hauling grounds which carry buckshot in their bodies. At each killing the natives gather up a collection of slugs. That other animals escape only to die later on may reasonably be inferred. In the summer of 1896 several seals wounded by shooting were known to die after coming ashore on the rookeries.[2] What the percentage of loss may be which thus results can not be determined. The hunters themselves can not tell what effect their shots produce, where the animal is not recovered. It may escape unhurt, may have been slightly wounded and thus likely to recover, or so seriously injured as to cause it to give up later on and die.

The greatest loss probably results from the use of the rifle. Where the range is considerable and the animal is killed instantly it sinks out of reach before the boat can get it. With the shotgun the same result is likely to occur, but the range being shorter not so many animals are lost. Of late years the loss of shot seals has been greatly diminished, because it has been found that when the animal is shot in the head or neck and the lungs left full of air the body does not sink so rapidly.

THE SPEAR LEAST WASTEFUL.

With the spear the loss must be very slight. Where the animal escapes by the tearing out of the spearhead it doubtless recovers, but these instances are rare. That some animals escape through the breaking of the line attached to the spearhead is shown by the number of these weapons picked up on the rookeries. Two spearheads with the lines attached were found fastened in the rocks on Zapadni rookery of St. Paul in 1896. The lines had become fast and the animals had torn themselves loose. During the past season a cow came ashore on St. Paul with a spearhead through her back which, while it did not kill her, left her crippled and useless.[3]

---

[1] Proc. Fur Seal Arb., vol. 9, p. 351.

[2] See Daily Journal, Part II, date of July 25, 1896.

[3] See Daily Journal, Part II, date of August 15, 1897.

Of the two methods of killing the seals at sea the spear is the surest and resul in the least waste. Both methods have their special fields, however, and tl regulations under which pelagic sealing is now carried on, as if designed express for the pelagic sealer, recognizes them clearly. Thus, when the seals are on the migrations and consequently alternately traveling and resting both firearms ai spears are allowed. For the traveling seal the gun can be used; for the sleepir seal the spear. On the feeding grounds in Bering Sea only the spear is allowe There the animals are found almost exclusively sleeping or feeding. The noise of tl gun would be a positive disadvantage, as it would startle all the seals in the vicinit From the point of view of the herd both methods are deadly, the difference beir merely one of degree.

NORTHWEST COAST SEALING.

Pelagic sealing is carried on in two distinct areas and at two distinct season While the seals are on their return migration along the American shore they are m by the pelagic fleet off the coast of California at about the latitude of Poi Conception. From here northward to the vicinity of Middleton Island the herd followed by the pelagic fleet. Formerly seals were also taken along the coast of tl Alaskan peninsula to the passes by which they entered Bering Sea. At prese the closed season begining in May shuts off this catch.

BERING SEA SEALING.

In Bering Sea sealing is carried on in the summer feeding grounds of the f seals. These grounds are located from 100 to 200 miles distant from the islands ar lie chiefly to the westward and southward in the deep water off the 100-fathom curv They are frequented chiefly by the female seals which leave the rookeries at regul intervals during the summer to feed, returning to nourish their offspring.

It is not necessary here to go into greater detail regarding these matters nor mention the sealing grounds of the Commander Island herd. These matters are taken up in detail by Mr. Townsend in a special paper which appears elsewhere Part III of this report.

THE PELAGIC CATCH.

In the statistical appendix to the present volume will be found a detailed table the pelagic catch from the various hunting grounds. From this table we may he give the following summary:

Total pelagic catch in all waters, 1868-1897.

Pribilof herd:	
Northwest coast	395,880
Bering Sea	240,908
	636,788
Commander herd: Japan and Russian coasts	256,259
Total	893,047

In addition to this total there are 95,000 skins which have been taken, but for which the definite locality of capture has not been determined, making a grand total of 988,047 animals, or approximately 1,000,000 seals, known to have been killed at sea from the combined Russian and American herds.

THIS DOES NOT INCLUDE SEALS KILLED BUT LOST.

The figures just given include only animals actually secured and whose skins were brought to market. No attempt has been made to form any estimate of the number of animals which escaped to die of their wounds, or of those killed outright, whose bodies sank before they could be secured. The loss arising from these sources is considerable even at the present time, where firearms are used, and in the early days of their use it must have been very great.

EARLY SEALING CONFINED TO PRIBILOF HERD.

Until the year 1891 all pelagic sealing was confined to the Pribilof herd, and prior to the year 1883 all the seals were taken off the Northwest coast. After 1883 sealing in Bering Sea was added. In 1891 a modus vivendi was declared on June 15, designed to close Bering Sea.[1] This measure was renewed in the two succeeding years, pending the results of the Arbitration Tribunal. It may be remarked in this connection that the importance of this modus vivendi of 1891–1893, in its relation to the herd, was not great. Its promulgation in 1891 was too late to make it effective, as the fact that the herd lost 19,000 more seals at sea in that year than in 1890 abundantly shows. In 1892 it merely checked the increase of the catch, leaving it still 6,000 more than it was before the measure was put into effect. In 1893, when the catch fell to 30,000, which was but 10,000 less than the catch of 1890, the herd derived some benefit. Of course, if we take into account what the herd might have lost through the increase of the catch in this period, the benefit to the herd was greater. But it was at best only a postponement of the loss, as in 1894 the catch rose immediately to 61,000—double that of 1893—and was in 1895 still 16,000 greater than the catch of 1890; its decline since that time has been due to the diminishing herd.

THE SUSPENSION OF LAND KILLING.

On the other hand the suspension of killing on land only released young males to grow up which are now, as idle and superfluous bulls, a menace to the rookeries. In the case of the pelagic sealers the measure only postponed the time of taking the seals, as the females which escape in one season are still available the next, while on land the young males released were irrevocably lost to the Government and the lessees, because before normal conditions were resumed they had taken on the wig of the half bull, and their skins became of no value. The suspension of land and sea killing, therefore, during the modus vivendi, was at best of very doubtful value.

MODUS VIVENDI TRANSFERRED SEALING TO ASIATIC SIDE.

The modus vivendi, however, had this effect: It influenced a certain number of sealing vessels to try their luck on the Asiatic side of the Pacific Ocean. These, in

---

[1] See footnote to page 144 of this volume.

1891, took a small catch of 8,000 seals from the Commander herd. In 1892, when the modus vivendi was renewed and made effective, a larger number of vessels crossed over at the close of the spring sealing off the Northwest Coast; and in 1893, Bering Sea being again closed, the greater part of the sealing was transferred to the Asiatic side. The growth of the catch from the Commander Island herd was very rapid. Beginning with 8,000 skins in 1891, it numbered 66,000 skins in 1893.

THE DECLINE OF THE CATCH.

During the period from 1868 to 1880 the pelagic catch was merely nominal, ranging from four to five thousand skins yearly. With the year 1881 it increased steadily until 1894, when the maximum was reached in a catch of 141,143 skins. Since that year it has rapidly declined to a total of about 39,000 skins in the season of 1897.

The following table will make clear the fact of this decline:

Year.	Pribilof herd.	Commander herd.
1894	61,838	79,305
1895	56,291	37,035
1896	43,917	24,191
1897	24,321	13,801

UNFAVORABLE WEATHER NOT THE CAUSE OF DECLINE.

The decline in the pelagic catch has been explained by the sealers as due to unfavorable weather[1] and ill luck in locating the animals rather than to any lack of seals. It is unnecessary here to discuss the matter at length. Reference to Mr. Townsend's notes and tables of daily catches, published in Part III of this report, will show clearly enough that no marked difference has existed between the weather conditions of recent seasons and those of earlier ones. The real cause of the decline in the pelagic catch, of course, is the depleted condition of the herd. With a herd reduced to less than one-fifth its original size it could not be reasonably expected that the usual number of animals could be found at sea.

PELAGIC KILLING AND LAND KILLING COMPARED.

It will help us to arrive at a just appreciation of the relation of pelagic sealing to the history of the fur-seal herd if we compare its catch with that taken on the islands. In the following table we have this comparison fully set forth. There is given, in addition to the total number of males killed for all purposes, the date at which the quota was each year filled, the number of hauling grounds which it was necessary to drive from, and the number of drives required. These are taken from the records of the islands. The statistics of the pelagic catch are taken from the official data of the Treasury Department, which is given in full in Appendix I.

---

[1] Ber. Sea Quest., Dept. Marine and Fisheries, Ottawa, 1896, Venning, p. 16.

Statistics regarding land and sea killing, 1871-1897.

Year.	Date quota filled.[1]	Hauling grounds driven.[1]	Number of drives.[1]	Killed on land.[2]	Killed at sea.
1871	July 28	46	43	102, 970	16, 911
1872	July 25	43	30	108, 819	5, 336
1873	July 24	51	37	109, 177	5, 229
1874	July 17	61	41	110, 585	5, 873
1875	July 16	55	37	106, 460	5, 033
1876	Aug. 1[3]	36	30	94, 657	5, 515
1877	July 14	44	32	84, 310	5, 210
1878	July 18	54	35	109, 323	5, 544
1879	July 16	71	36	110, 411	8, 557
1880	July 17	78	38	105, 718	8, 418
1881	July 20	99	34	105, 063	10, 382
1882	July 20	86	36	99, 812	15, 551
1883	July 19	81	39	79, 509	16, 557
1884	July 21	101	42	105, 434	16, 971
1885	July 27	106	63	105, 024	23, 040
1886	July 26	117	74	104, 521	28, 494
1887	July 24	101	66	105, 760	30, 628
1888	July 27	102	73	103, 304	26, 189
1889	July 31	110	74	102, 617	29, 858
1890	July 20[4]	87	55	28, 059	40, 814
1891	....	(5)	(5)	12, 040	59, 568
1892	....	(5)	(5)	7, 511	46, 642
1893	....	(5)	(5)	7, 396	30, 812
1894	Aug. 4	....	....	16, 270	61, 838
1895	July 27	....	....	14, 846	56, 291
1896	July 27	31	21	30, 654	43, 917
1897	Aug. 7	42	27	19, 200	24, 321

[1] These figures refer only to the hauling grounds of St. Paul.
[2] These totals include all males killed for any purpose on the islands.
[3] In 1876 the killing was closed at an unusual date, said to be on account of an exceptionally late season.
[4] Closed by order of the agent in charge.
[5] Years of the modus vivendi.

THE PERIOD FROM 1871-1882.

For purposes of study we may divide this record into two sections, the first covering the period to and including 1882. During this time we find that the number of animals taken on land as well as at sea was each year relatively constant, the former being maintained at a maximum, the latter at a minimum. We find that from 1874 to the close of this period the requisite number of killable seals could be procured at such an early date as to clearly indicate that no difficulty was experienced in filling the quota. During the whole of this time the number of drives and hauling grounds driven from was uniform and normal. In short, all the evidence goes to show that the herd was in a state of practical equilibrium, neither increasing nor diminishing to any marked degree. The reduction of the number of animals killed on land in the last year of this period has already been discussed in its appropriate place. It has no significance here.

THE GROWTH OF THE CATCH.

It will be seen, however, in the record of pelagic sealing that from a normal catch of slightly over 5,000, covering a period of eight years, it advanced to 8,000 in 1880 and to 15,000 the closing year of the period. This latter fact is significant.

RELATION OF GAINS AND LOSSES IN THE HERD.

We have already shown that the condition of the fur-seal herd is determined by the relation of its gains and losses. Its losses are of two kinds, natural and artificial. We may class as natural those losses arising from old age, accidents of the sea, or the struggles on the rookeries. The sole artificial loss to which the herd has been subjected is that resulting from pelagic sealing. We may assume that the natural losses of the herd were in these early days, as now, constant and uniform. With the small added loss resulting from pelagic sealing they balanced the gain of the herd due to the influx of young breeders. It may be that the loss entailed by the pelagic catch was the final determining check on the herd's increase. As we have seen, in the last year of the period we are considering, this pelagic catch was trebled.

PERIOD SUBSEQUENT TO 1882.

If now we take into consideration the period subsequent to 1882 we find that this increase in the pelagic catch was maintained and steadily augmented until at its maximum in the year 1894 it exceeded by twelve times the normal size of the catch in the former period of equilibrium. On the other hand, we find the land catch which was maintained at its normal rate until the year 1889, suddenly fell to one-fifth its size in 1890, and has remained there since.

EXPANSION OF PELAGIC, DECREASE OF LAND SEALING.

From a study of these statistics two important facts are made clear: First, that there has been since 1880 an enormous expansion of pelagic sealing; second, that there has been in the same period a marked decrease in the product of land sealing. From what we know of the nature of the two industries and their effect on the herd we are prepared to find these two facts related to each other as cause and effect.

We need not repeat here the proof that land killing has had nothing to do with the decline of the herd. It must be pointed out, however, that land killing is strictly dependent upon the condition of the breeding herd. The quota of any given year represents the male animals which survive to the age of three years from a given birthrate. As the quota of males is, so will be the increment of young breeders which the herd receives. A diminished quota therefore means a diminished gain to the breeding herd for the same year.

CAUSE OF DECREASE TO BE SOUGHT IN THE BREEDING HERD.

Naturally, the cause of any diminution in the supply of killable seals must be sought for in the condition of the breeding herd three years previous. From this fact it becomes apparent that for the cause of the enormous reduction in the bachelor herd seen in the quota of 1890 we must look back to the year 1887, and inasmuch as the decline in the bachelor herd was great and alarming in 1890, the depletion of the breeding herd in 1887, when the seals for this quota were born, must have been equally great and striking. The date of the decline in the herd must, therefore, fall prior to the year 1887.

From what has been said about the relation of the bachelor herd to the breeding herd it must also be plain that no serious diminution had occurred in the birth rate prior to 1882, else it would not have been possible to maintain, as was done until 1889, by any possible means the killing of 100,000 animals of no matter what age or size.

THE BEGINNING OF THE DECLINE.

We may therefore assume that the decrease in the breeding herd began somewhere between 1882 and 1887. It is impossible to locate the exact date. We have assumed the years 1882–1885 as the approximate date, because in the latter year it was necessary to greatly increase the number of drives and the number of hauling grounds driven from to get the regular quota. This will be apparent from an inspection of the preceding table. The cause of this scarcity of killable seals must necessarily date back three years, or to 1882. Moreover, within this period occurred the extension of the operations of pelagic sealing into Bering Sea. Again, in the year 1882, the pelagic catch was trebled in size and thereafter continued to increase, while from the steady retardation of the date at which the quota could be filled and the increased number of drives necessary, the bachelor herd as steadily declined.

PELAGIC SEALING AS A CHECK FROM 1871-1880.

During the long period from 1871 to 1880, we may infer that the pelagic catch had no influence on the herd except perhaps with other causes to neutralize possible increase. With the rise of the catch to 15,000 in 1882, we may assume that the strain was too great and that the equilibrium was broken. The further increase to 24,000 in 1885 intensified the decline, and when in 1887 the pelagic catch reached 46,000 it became serious.

In estimating the influence of the pelagic catch in these early days it must always be borne in mind that the catch as recorded is only a part of the loss which the herd sustained through pelagic sealing. It will never be possible to estimate the loss, due to the killing of animals which were not recovered, but that it was great we have no reason to doubt, and it must not be left out of the account.

IRREGULAR QUOTA SINCE 1890.

Since the year 1890 the results of land killing can not be taken as an index of the condition of the herd from year to year. In the years 1891–1893 land killing was arbitrarily contracted under the modus vivendi. The quotas of 1894 and 1895 were influenced by the changed methods of driving practiced in these years, and by the heavy pelagic catches of 1890 and 1891 resulting in the starvation of pups in these years. The quotas of 1896 and 1897 have been in turn slightly influenced by the protection afforded by the modus vivendi, which reduced in a measure the pelagic catch of 1892 and 1893, thus saving pups from starvation. The results of the heavy pelagic catches of 1895 and 1896 have yet to show themselves in the coming quotas of 1898 and 1899.

PELAGIC SEALING AND THE COMMANDER HERD.

We may here, for the sake of illustration, compare similarly the land and sea catches from the Commander herd. Pelagic sealing began on this herd in 1891. As the fleet was a large one, its results have been more rapid and disastrous than in connection with the Pribilof herd. The following are the comparative figures:

Pelagic catch of Commander herd, 1891–1897.

Year.	Sea killing.	Land killing.	Year.	Sea killing.	Land killing.
1891	8,432	36,815	1895	37,035	17,719
1892	26,752	31,244	1896	24,191	13,516
1893	66,143	32,786	1897	13,801	11,335
1894	79,305	27,287			

THE INTERRELATION OF PELAGIC AND LAND CATCHES.

The relation of the pelagic catch to the land catch is here well illustrated. The catch in 1891 was small. Its effect on the bachelor herd was slight and together with the larger catch of 1892 accounts for the reduction from 36,000 to 31,000 in the land catch. Bearing in mind the fact that the really important effect of the pelagic catch of any year is only seen in the herd of killable seals after three years, we are prepared to find the first marked reduction in 1895, and are not disappointed. The quota of 1895 is less than half the quota of 1891. Since 1894 the pelagic catch from the Commander herd has rapidly declined, showing how pelagic sealing has exhausted its own resources. Its catch of 1897 on the Asiatic side is about one-sixth the size of its catch for 1894.

In the case of the Pribilof herd the result has not been so striking. As against 61,838 seals taken in 1894 we have 24,321 taken in 1897. But the results of the modus vivendi, the closed zone and the closed season are seen in this herd. The Commander herd has had no modus vivendi or closed season, and the protected zone has been but one-half as great as that of the Pribilof herd.

The example of the Commander herd strengthens the evidence in the case of the Pribilof. With the former, as with the latter, the decline of the herd and the expansion of pelagic sealing practically go together. If no other proof was available than what these figures adduce we must be forced to the conclusion that pelagic sealing has been the cause of the decline.

CHAPTER XII.

THE EFFECT OF PELAGIC SEALING.

PELAGIC SEALING INVOLVES THE KILLING OF FEMALES.

In the foregoing discussion we have assumed for the time being that pelagic sealing has been the cause of the decline in the fur-seal herd. The relation of the land catch to the sea catch is such as to lead inevitably to this conclusion. But there remain other and better reasons for holding pelagic sealing responsible for the decline.

As has been already shown, only males are killed on land; the females are not disturbed. On the other hand, at sea animals of every age and condition, and of both sexes, are taken. In the water it is impossible to distinguish the sexes, and all animals seen are killed if possible. On land the habits of the animals are such that the males can be readily separated and handled without disturbance to the females.

PELAGIC SEALING AND THE SEALING OF THE SOUTH SEAS.

With the above contrast between land and sea killing in mind, we may pause for a moment to consider the strange proposition put forward in the British contention before the Paris Tribunal, that "the methods practiced on the Pribilof Islands and those practiced in the southern hemisphere" were parallel in results. This was in answer to the contention by the United States that pelagic sealing was essentially the same as the sealing which destroyed herds of the Antarctic. On the contrary, say the British commissioners in 1891, the history of the rookeries of the south seas proves incontestably that "excessive slaughter on shore in the entire absence of pelagic sealing results in commercial extermination."[1]

The absence of pelagic sealing in the southern hemisphere has nothing to do with the matter. It would be absurd to expect pelagic sealing there when there was nothing to prevent the sealers from landing and directly invading the rookeries. It is safe to say that there would have been no pelagic sealing in the northern hemisphere had it been possible for any who might choose to do so to land and kill females on shore.

METHODS OF SOUTHERN SEALING.

In the case of the rookeries of the southern hemisphere, men armed with clubs or firearms were landed on the rookeries, who killed all the animals they could secure, making no distinctions as to sex, age, or condition. In a day or a week they returned to complete the work of destruction if it was not complete at the first trial. It must appear from a candid contrast of such slaughter that it has nothing in common with land killing on the Pribilof Islands beyond, perhaps, the fact that in both cases the killing is done on shore and with a club.

---

[1] Rep. of Brit. Comm., Fur Seal Arb., vol. 6, p. 217.

Suppose that a crew of 25 or 30 men were landed in July on Reef rookery of St. Paul; that these men entered the breeding grounds and slaughtered every animal they could reach, keeping up the operation day after day as new animals came ashore or until no more were found, returning the following season to pick up any remnant which might be left. This would be the method of slaughter in the southern hemisphere transferred to the northern.

"INDISCRIMINATE," NOT "EXCESSIVE."

The trouble with the contention of the British commissioners lies in the use of "excessive" for "indiscriminate." It was not the contention of the United States that the land killing of the south seas was identical in method with open-sea killing in the north, but rather that the results were identical. Both were indiscriminate killing, and, as a result, it was to be expected that the fate of the southern rookeries would overtake those of the north if such slaughter were continued. That the herds of the north have lasted longer than those of the south is simply the results of their protection on land. Were it possible for the pelagic sealers to land on the Pribilof and Commander islands, they could accomplish in one season what it has taken a dozen years to accomplish contending with the uncertainties of the sea.

PREPONDERANCE OF FEMALES.

Before the Paris Tribunal, and even subsequent to it, the claim has been made that land killing was excessive in its reduction of male life, and had been in large measure, if not wholly, responsible for the decline. We have already discussed the latter part of this contention and shown its untenable character. The fact, however, is freely admitted that the killing on land had greatly reduced the male life of the herd. The investigations of the past season, showing that about twenty-nine males out of thirty born are destined to be superfluous, indicate how this has been possible without affecting the herd. Since the islands came into the possession of the United States nearly 3,000,000 male seals have been taken on land, while no females whatever have been killed.

The point we wish to make clear is, that with such an abstraction of male life it naturally results that the herd as a whole under normal conditions must show a large excess of females. Notwithstanding this self-evident fact, it has been persistently contended by those interested in pelagic sealing that the pelagic catch contained no preponderance of females; that in fact the sexes as found and taken at sea were practically equal.

THE SEALING CAPTAINS' RECORD OF SEXES TAKEN.

To illustrate this, we may say that under the regulations of the Paris award it was made obligatory on the captains of sealing vessels to keep a record of the sexes of all animals taken. It was manifestly absurd to suppose that men engaged in a business like pelagic sealing would take the trouble to report accurately facts which must injure their business. The result has been that whenever the sex returns have been supplied by the sealers themselves the sexes have been reported so nearly equal that the proportion of females has on the average rarely exceeded 55 per cent. What we have said regarding the relation of land killing to the proportion of the sexes is sufficient proof of the falsity of these returns. But we also note that during the period covered by these returns by the sealers, showing an excess of no more than 5 per cent of females, it was possible to secure only 81,000 males on land, whereas 187,000 animals, males and females, were taken at sea. That 45 per cent of this latter number should have been males is simply out of the question.

CUSTOM-HOUSE EXAMINATION BY EXPERTS.

Fortunately, however, we are not forced to rely merely upon inference or upon the reports of interested parties for our information in this matter. For the past four seasons the United States Government has provided for the examination, by experts, of the pelagic catches of American vessels in the custom-houses on their landing. These returns are as follows for the seasons 1894–1897:

Experts' sex returns for American catch.

1894.	Per cent.	1896.	Per cent.
Northwest coast	88	Northwest coast	93
Bering Sea	69	Bering Sea	75
1895.		1897.	
Northwest coast	74	Northwest coast	93
Bering Sea	73		

CONTRAST OF SEX RETURNS.

With these figures may be compared the percentages furnished by the logs of the captains of the Canadian sealing fleet, which we are forced to use, as Great Britain has refused to permit the inspection of the Canadian catch in port. No returns for these vessels are available for the Northwest catch until the spring of 1896, when the percentage of females is given as 40. With it may be compared the expert report of 93 per cent for the American vessels on the same grounds in the same season. For the three seasons, 1894–1896, the Canadian reports for the Bering Sea catch are respectively 55, 55, and 61 per cent females. The vessels of the American fleet were engaged during the same time and side by side with the Canadian vessels. The latter average 52 per cent of females and the former 80 per cent. Comment is not necessary.

This high proportion of females in the pelagic catch is borne out by the expert examinations of furriers in London. See affidavits in Appendix II.

THE SEX OF SALTED SKINS EASILY DETERMINED.

It may be remarked that it is entirely feasible to determine the sex of the salted skin, as reference to Mr. Townsend's paper on this subject published in Part III will show. There is, therefore, no doubt of the accuracy of the results of the custom-house examinations.

THE INVESTIGATIONS OF ALEXANDER AND HALKETT.

With a view to studying the operations of pelagic sealing in 1895, Mr. A. B. Alexander was detailed to make the cruise on one of the pelagic sealing vessels.[1] The results of his observations are published elsewhere in this report and contain the most complete account of the methods and operations of pelagic sealing yet obtained. Mr. Alexander found in the catch of the Dora Sieward, numbering about 1,500 seals, 62 per cent of females. The following year Mr. Andrew Halkett, making a similar investigation for the Canadian government, found in the catch of the same vessel also in Bering Sea the percentage of females to be 84.[1]

---

[1] A complete account of the cruise will be found in Part III of this report.

The difference between the results of these two investigations shows that the proportion of the sexes may vary considerably from season to season and between different vessels. It must not be forgotten, however, that these reports are based on the catches of individual vessels. The returns for the fleet of 18 American vessels in 1895 gives the percentage of females as 73, while for the fleet of 13 vessels in 1896 it is 75 per cent. It is probably not possible to determine more definitely the exact proportion of females, but these figures are sufficient with the known preponderance of the female sex to show that the proportion is large.

THE FEMALES MORE EASILY TAKEN.

It may be noted that the habits of the animals are such as to make it probable that were the sexes equally numerous at sea the females would be taken in greater numbers. In the spring of the year off the Northwest Coast the female is heavy with young, and consequently more sluggish than the young males. In Bering Sea it is the mother driven by the necessity of nourishing her offspring that is found constantly on the feeding grounds. In either case her necessities and habits leave her the easy victim of the pelagic hunter.

THE CAPTURE OF MALES NOT IMPORTANT.

We have not taken into account the fact that a certain number of males are necessarily taken by the pelagic sealers. It is unnecessary to do so. With the males taken in this way we have no concern. Their capture decreases the profits of the lessees of the islands and the revenue of the Government, but does not affect the herd any more than does the killing of males on land. It is for this reason that they may be left out of consideration in this discussion.

The important matter is that of the animals taken at sea by the pelagic sealers from 62 to 84 per cent are females. It may be remarked here that we are not concerned to make this percentage of females high. Were it a fact that among the animals taken at sea the males were in the excess of the females, the difference would be merely one of degree. So long as females in any number are taken, the herd is injured, and the injury is greater in proportion as the number killed is greater.

POSSIBILITY OF EQUILIBRIUM UNDER PELAGIC SEALING.

Much has been said of late by those interested in the retention of pelagic sealing about the tendency to equilibrium which is to be found in the rapid falling off of the pelagic catch. In 1896 Professor Thompson of the British Commission professed to believe that this equilibrium had then been reached, and that we might under present conditions hope for a perpetuation of the numbers of the herd as found in that year.[2] The investigation of 1897, showing a marked decrease from the condition of 1897, demonstrated clearly that this was a mistake, a fact which Professor Thompson admits in his 1897 report.

---

[1] See Halkett MSS., Report 1896.

[2] Thompson, Mission to Bering Sea, 1896, p. 35.

THE EQUILIBRIUM A THEORETICAL FACT.

There is, however, a certain amount of truth in this idea of equilibrium, and we may inquire what it is and what will be the condition of the herd and of the industry of pelagic sealing when it is reached.

As already indicated, the condition of the fur-seal herd is determined by the relation of its various losses to its single source of gain, the yearly accession of young 3-year-old breeders. From the history of the herd in the period from 1871 to 1880 we know that the various losses which the herd suffered about balanced its gain, and there was neither increase nor diminution. From the nature of the losses which the herd is subject, to we may infer that in its less crowded condition within the past few years, they have been somewhat mitigated. This would be especially true of the loss through the parasitic worm and through fights and struggles on the breeding grounds. Under normal conditions in its present state, the herd might be expected to increase by a slight margin each year. That it does not so increase is due to the action of pelagic sealing. The measure of this possible increase in the herd is the margin of difference between the number of 3-year-old females which enter the breeding grounds in any season and the total number of deaths resulting to the adult breeding herd from old age and the incidents of the sea.

DEATH FROM OLD AGE.

If we assume for the breeding female an average life of thirteen years, this would give a breeding life of ten years, and the death rate from old age must each year amount to about 10 per cent of the breeding herd. On the other hand, it is clear from the proportion between the breeding herd of 130,000 and the quota of 20,000 for the present year that the proportion of pups which survive from any birth rate to the age of 3 years is about one-third to one-fourth of the total number. The quota of the present time is therefore roughly a measure of the gain of the herd, as an approximately equal number of young females must survive.

A HYPOTHETICAL CASE.

As an illustration, let us assume for any given year a total breeding herd of 180,000 cows. Of these 150,000 would be adults and 30,000 young cows coming into the herd for the first time as breeders and representing the normal gain of the herd. Assuming that, as a result of storms at sea, old age, and attacks of enemies, 10 per cent of the herd are lost in the winter migration, this would mean the absence of 18,000 animals for the succeeding season, to cover which and provide for continued increase the herd receives a gain of 30,000 young animals. The net gain to the herd is, therefore, 12,000 breeding females. This is a liberal estimate of gain.

THE POSSIBLE ABSTRACTION OF FEMALES.

If the killing of female seals produced only the direct loss entailed by their absence, this removal of 12,000 females from the hypothetical stock of 180,000 breeders would leave the herd in a state of equilibrium. But for each life thus lost results the death of an unborn pup, and with such part of the 12,000 females as are taken in Bering Sea nursing pups die also. This secondary loss is felt later in a diminished accession of breeding 3-year-olds. In other words, the yearly increme of 30,000 could not be maintained, and as a matter of fact the taking of 12,0 females would cause the herd to decline.

THE SECONDARY LOSS OF PUPS.

We can estimate approximately this secondary loss. For the 12,000 femal killed an equal number of unborn young are destroyed, and if one-half of them a killed during the summer, 6,000 additional young will starve; in all, 18,000 young a lost. But as only one-third of them would naturally survive to the age of 3 years, an but one-half of these would be breeders, the total loss would be about 3,000. Thi at least, must be deducted from the 12,000, leaving 9,000 females which can be take from the herd and still leave it in a state of equilibrium. The abstraction of female therefore, which the herd of 180,000 breeding females can stand without declining, i not to exceed 5 per cent.

We do not put this percentage forward as absolute. Its value rests solely upo the percentage of young which survive to the age of 3 years. We have assumed tha one-third so survive, and this is probably a maximum, but for the purposes of th calculation it will answer.

To determine whether or not the effect of pelagic sealing is such as to warrant th supposition that a state of equilibrium has been or is likely to be reached soon, w have only to refer to the pelagic catch for the year 1896. The summer catch of 189 in Bering Sea numbered 29,500, of which 84 per cent were females. The spring catc of the same year was 14,400, of which 93 per cent were females, making in all 38,00 females from a herd of about 160,000, approximately 24 per cent, with additional los to appear in 1899 from the destruction of young life.

PELAGIC CATCH STILL INVOLVES 16 PER CENT OF ALL FEMALES.

In view of the heavy falling off which pelagic sealing has undergone in 1897, w may carry out the computation for this season also. There were taken in the sprin of 1897 off the northwest coast 7,857, of which 93 per cent, or 7,300, were females. I Bering Sea 16,454 were taken, of which, using the percentage of 1896, which is low, 8 per cent, or 13,800 were females, making in all for 1897 21,000 females. This fo a herd of 130,000 is 16 per cent. It is evident that pelagic sealing must still fal considerably before equilibrium is reached.

IT MUST FALL TO ONE-THIRD BEFORE EQUILIBRIUM COMES.

In short it would appear that the pelagic catch must fall to about one-third it present size before the decline in the herd ceases. It is doubtful whether such reduction will result. The haunts of the seals are too convenient. The same vessel may not go out each year, but enough will be ready to risk the chance of a remuner ative catch to keep the herd on the down grade. The very reduction of the flee in one season will stimulate the business for the next, each vessel hoping that it neighbors will drop out, thus leaving a clear field. It is probable that so long as th herd exists there will be a sufficient number of adventurous spirits to prey upon i and continue its decline. The history of the repeated unsuccessful attempts to secur seals on the rookeries of the south seas fully illustrate what may be expected in th north. If the spirit of adventure is sufficiently strong to lead to the fitting out of schooner, as was done in 1897, to visit the Galapagos Islands on the possibility o taking seals there, we may not expect that the more accessible haunts of the seals of the North Pacific will be abandoned.

THE EQUILIBRIUM COULD NOT BE MAINTAINED.

In a theoretical sense there is a state of equilibrium of the herd which is compatible with a limited amount of pelagic sealing. The condition of this equilibrium we have just discussed. We know it must be too low to leave any profit either in pelagic sealing or in land sealing. Pelagic sealing, already unprofitable, must be reduced to less than one-third its present extent before this state of equilibrium is reached. No manner of protection could enforce the necessary limits to such pelagic sealing and they are not self-adjustable. Furthermore, the herd under such conditions would not be worth protecting on land. Any such protection must be maintained at a loss to the United States. To remove it from the herd even for a short period of time would leave the breeding haunts of the animals open to invasion, and the destruction so vigorously begun at sea would be speedily completed on land.

EQUILIBRIUM EXISTS ONLY FAR BELOW COMMERCIAL RUIN.

Thus, while an equilibrium is possible, it must not be forgotten that it exists only far below the point of commercial profit, and must prove unsatisfactory either to the interests of the United States or to those of the pelagic sealer.[1]

---

[1] This equilibrium of the fur-seal herd is a mere figure of speech, a juggling with words for diplomatic purposes. In the conclusions of the recent conference of experts at Washington the possibility of this theoretical equilibrium was acknowledged by both sides, because self-evident whatever the conditions. But the fact was not considered in any way pertinent, as "equilibrium" in this sense is only another name for commercial destruction. This admission that pelagic sealing tends to cease as the herd dies out has however been used by the Canadian Government as a pretext for declining to take immediate action in the fur-seal matter. (See Senate Doc. 40, Fifty-fifth Congress, second session, 1897, p. 65.)

This theory of equilibrium has received an attention wholly undeserved. In his report for 1896 Professor Thompson suggested that the equilibrium was then reached. He was forced in the investigations of 1897 to admit that the herd had suffered a measurable decline since 1896. Notwithstanding this fact we find the following statement in the concluding paragraph of his report for 1897: "A remedy has already been automatically applied in the reduction of the pelagic fleet to less than one-half its numbers of a year ago. The tendency is to equilibrium. The total pelagic catch for this year is not likely to exceed 20,000, against 36,000 last year, and it may be that with a catch so greatly diminished the point of equilibrium has at length been attained."

It is certainly remarkable that Professor Thompson should speak of commercial destruction as a "remedy" for zoological destruction. This is another way of saying that "death cures all ills;" but that mode of cure does not satisfy the friends of the patient. It is, moreover, not true that the point of equilibrium is reached, nor can it be reached until the catch at sea falls to less than one-twentieth of the actual number of breeding females. Pelagic sealing must therefore decline to one-third its present catch before the equilibrium is reached.

The British Government is not unaware of these facts, but to give them due recognition in action would interfere with the national policy in this matter. This is to permit the Canadian sealers to get out of the fur-seal herd everything they can before the failure of the herd forces the alleged industry wholly out of existence. In other words, one chief function of British Imperialism is to serve as a "fence" for greedy colonies over whose actions she has no control. We find no more fitting words to characterize the attitude of Great Britain toward this fur-seal question than the words of Professor Nicholson, of Edinburgh: "There can be no question, in the light of history, that the political instinct of the English people—or to adopt the popular language of the moment, the original sin of the nation—is to covet everything of its neighbors worth coveting, and it is not content until the sin is complete."

THE DESTRUCTION OF UNBORN PUPS.

Hitherto we have considered only the direct loss to the breeding herd resulting from the killing of females. There is, however, an important secondary loss resulting from the destruction of the young. Not only is the adult female, with the possibility of future increase through her, lost to the herd, but the times and seasons of her slaughter are such that her unborn and her dependent offspring must alike die with her.

PREGNANT AND NURSING FEMALES.

The investigations of the commission as to the condition of female seals taken in Bering Sea are given in detail in a special paper on the breeding habits of the seals, by Mr. Lucas, in Part III of this report. We may here quote a brief summary of the results:

> A total of 176 females taken during the seasons of 1895 and 1896 between August 10 and September 3 were examined, and may be considered as fairly representing the age and condition of seals taken at sea. Of these 176 there were 14 yearlings, sixteen 2-year-olds, and 146 over 2 years old. All over 2 years old had brought forth young the season in which they were taken, and 151 of those 2 years old and upward were pregnant. The total number of seals examined whose condition was at all uncertain was 11, and 7 of these were 2-year-olds examined before August 22, which might have been impregnated later in the season.

PELAGIC SEALING TAKES COMPOUND INTEREST.

Thus pelagic sealing eats into the life of the herd at compound interest. The rookeries in 1897 showed a direct diminution from the loss of females killed during August and September of 1896 and the spring of 1897. This direct loss was supplemented by the aftereffects of the premature destruction of the young born in 1894, which manifested itself in the diminished quota of killable seals and in the correspondingly diminished increment of young breeders. In like manner the future will show the continued effects of the destructive industry. For the pups starved to death in 1896 and those starved in 1897 the rookeries must suffer in 1900 and 1901 whether pelagic sealing continues or not.

DESTRUCTION OF NURSING PUPS.

As the starvation of pups has been the source of a great deal of discussion, it will be necessary to consider the matter in some detail. It was strongly contended in the British case before the Paris Tribunal that no such result as the starvation of the pup followed from the killing of the mother at sea. The claim of the United States that the pups were left to die of hunger was denominated in the same connection as "a contention wholly novel." It was further asserted that "it is not known that the breeding females go to sea for food while their pups are dependent upon them."[1]

PUPS DEPENDENT ON MILK UNTIL DECEMBER.

In the investigations of the season of 1896 these subjects received special attention. It was found that the pups continued to nurse their mothers as late as the 5th of December, being up to that time wholly dependent upon milk for nourishment.

---

[1] British Counter Case, Fur Seal Arb., Vol. 9, pp. 179 and 183.

Of pups killed for examination during September and October some were found to contain from one to two quarts of rich milk, the result in each case of a single meal. That the mother seal, an animal averaging 70 pounds in weight, should continue for upward of four months to nourish her young in this manner without feeding is sufficiently absurd on the face of it. But the results of Mr. Townsend's and Mr. Lucas's examination of adult females taken on the feeding grounds in Bering Sea, proves absolutely that the nursing females go to sea to feed.

THE ABSENCE OF EXCREMENT.

In support of the theory that the females do not leave the rookeries to feed while their pups are dependent upon them, the British commissioners of 1891–92 cited the "absence of all excrement on the breeding places." What the investigators of 1891–92 did or did not see we do not know, but during the past two seasons excrement was seen in quantities both on the breeding grounds and on the hauling grounds, as were also spewings containing the bones and flesh of fish. It is true that the aggregate amount of excrement seen is small in proportion to the number of animals, but this is due in all probability to the fact that the fur seal digests its food for the most part, if not wholly, before coming ashore, and as a natural result most of the excrement is voided in the water.

THE SUPPOSED NONFEEDING OF FEMALES.

A second proof adduced in support of the nonfeeding of the females was that no food had been found in the stomachs of the limited number of these animals examined up to that time. It was known that the stomachs of the bachelors were found to be empty at all times during the season. It was further absolutely known that the adult bulls fasted during the breeding season. From analogy to the bulls and from the absence of food in their stomachs it was assumed in a general way that the bachelors also fasted, and by carrying the chain of analogy one step farther it was assumed that the cows fasted also.

THE ABSENCE OF FOOD IN STOMACHS.

It is true that the stomachs of adult animals of all classes are wholly devoid of food when examined on land. Investigations on this score were made in 1896 and 1897 on a large number of bachelors and many cows. Some of the latter were killed immediately on coming ashore expressly to throw light on the question. But no food was found, not even in the stomach of a cow found choked to death on a fish bone. These facts, however, can not be expected to weigh against the conclusive evidence of the stomachs of both females and bachelors taken on the feeding grounds in August. That the fur-seal bull should fast is necessary. He comes on land in the spring loaded down with blubber in preparation for it, and grows excessively thin before the season is over. The cows and bachelors show no such provision. They maintain an even and moderate condition throughout the season. They could not do so if they fasted.

THE SEAL DIGESTS ITS FOOD IN THE WATER.

For the absence of food in the stomachs of the seals we must find a simpler explanation, and this seems to be that they remain in the water to digest their food. If it is not fully digested when the animal reaches the islands on returning from the feeding grounds, it loiters offshore swimming about, sleeping, or playing until digestion is completed.

This assumption also explains other things. For example, the band of idle seals hovering off the rookery fronts; the fact that the cows are not seen to come directly in from the sea; and the fact that pups killed in the water, sleeping and sporting in the same way, were found full of milk, while those killed on land were, as a rule, empty.

THE ABSURD THEORY OF INDISCRIMINATE NURSING.

But not content with establishing the fact that the mother seals did not leave the rookeries while their pups were dependent upon them, the British commissioners went on to show that if they did go away and were killed the pups did not necessarily starve, because they could obtain nourishment from other cows. In short, it was contended that the female fur seals in contrast to all other animals, nursed their young in common. This theory was supported by a series of ostensibly minute but faulty observations, which gave an air of plausibility to it.

FUR-SEAL MOTHER AND PUP.

The fur-seal mother displays little affection for her own young, but she displays less for her neighbors'. When she wants her pup, she calls lustily for it, and, finding it, lies down and nurses it without further ceremony. The pup when satisfied goes off and does not seek its mother until it is again hungry. As the majority of the mothers are absent at sea, the majority of the pups are always hungry. They are willing and ready to flock about the calling cow, who has difficulty among so many in attracting the attention of her own pup. The savage treatment she accords these strange pups makes them keep at a safe distance, and is clear enough proof of her unwillingness to care for them.

MISTAKEN OBSERVATIONS.

The mistakes that have been made in this matter have resulted from a misunderstanding or a misinterpretation of very simple actions. When the cow lands, she is likely to be met at the shore by half a dozen hungry pups waiting for their mothers. They flock about her and she snaps and snarls at them, calling her pup in the intervals. In due time it responds and joins the crowd of expectant pups. The mother recognizes it for a brief instant by shaking her head and smelling over it. This is all the attention it receives. She at once sets out to find a suitable place in which to rest. She may travel back the full length of the rookery, taking up her place in one of the rear harems. The pups may all follow her for a short distance, but gradually give up and return to the water front, all but her own pup, which persists, and in the end is allowed to nurse.

To omit from the observation the brief and simple recognition of the pup by the mother destroys its accuracy. This is exactly what the Canadian commissioner in his observations of 1892 did. He then tried to prove that a cow would nurse any pup if it was only persistent enough. His interpretation of an incident like the one cited above was that the pup which ultimately succeeded in nursing was a strange pup, whose persistency was finally rewarded.

It is not necessary to go into greater detail. In the daily journal are recorded the observations of the commission in this matter. It is not a matter of great moment, but from the prominence which this absurd proposition was given it has been necessary to discuss it.

THE SUPPOSED SELF-FEEDING OF PUPS.

But not content with proving that the mother did not leave the pup, and that if she did, the pup could easily find a foster mother, the British commissioners insisted that the pup could shift for itself and gain sustenance independent of any mother. This theory has been thus stated by Mr. Macoun:

> From the time the pups first go into the water, they are to be seen with pieces of seaweed in their mouths, and there is no reason for doubting that from this time until they leave the islands a considerable portion of their food is composed of seaweed, picked up along the shore or in the water adjacent to it.

THE ABSURDITY OF THE THEORY.

What nourishment an animal, whose natural diet for the time being is milk, and which is destined ultimately to feed on fish, could find in seaweed is not readily apparent. But this objection seemingly offered no difficulty. It may be observed that this theory rests again on a misinterpretation of very simple facts. The pup fur seal, like a young dog, loves to play with anything it finds at hand. It is a common sight, therefore, to see a pup swimming about with a yard or more of kelp streaming from its mouth. If observed closely, other pups will be found tossing dead shells, pieces of sticks, or even pebbles. A pup was observed to play for an hour with a small feather. It is as reasonable to suppose that the pup feeds on the feather or the shell as on the seaweed. They are all objects of play; nothing more.

This theory naturally went a step further, and assumed that crustacea and other animal life in the waters about the rookeries was drawn upon to supplement the seaweed diet of the pups. The leathery tunicates which are found strewn in large quantities upon the sand beaches of St. Paul after a storm have been looked upon as palatable and nutritious food for pups. It is supposed that these are the "tender algoid sprouts" of which Mr. Elliott makes mention as serving as food for pups.

DETERMINATION OF THE MATTER BY KILLING PUPS.

There being but one way to settle such a question as this, namely, to kill and examine the stomachs of the pups themselves, this method was adopted and thoroughly carried out during the months of September, October, and November, in 1896.[1]

---

[1] Mr. Macoun, of the British commission, was present while these investigations were made, and examined the stomachs of the pups killed. The stomachs in some cases contained milk, in others none. One stomach well supplied with milk contained two small amphipods; one had a small tunicate mixed with pebbles; another contained part of a soft-shelled crab; several had shreds of seaweed mixed with milk. All the stomachs contained the characteristic pebbles. This was the sum total of material aside from milk found in the stomachs of twenty pups killed from day to day and under circumstances most favorable for determining whether they were feeding or not. Mr. Macoun on the spot agreed that the examinations were sufficient and that there was nothing found to warrant the supposition that the pups had begun to feed for themselves. Notwithstanding this, in discussing the matter in his 1896 report, he makes the following grossly misleading statement:

"In addition to milk, it will be seen that the stomachs examined contained (1) seaweed, (2) ascidians, (3) small crustaceans, (4) soft-shell crab. That these were found with one exception only in stomachs which contained no milk, goes to show that the young seal when hungry avail themselves of the food that is to be found in abundance in the places most frequented by them." (Macoun, 1896 Report, MSS.)

A score or more of pups were killed under circumstances specially fitted to throw light on the subject, and their stomachs, with those of others dead from starvation and other causes, were found to be devoid of all food except milk.[1] Pups killed as late as the 5th of December were found full of milk, and at that time the cows were nursing their pups as at earlier times in the season. Owing to the mild weather, this was nearly a month later than the usual time for the departure of the cows and their young, and the pups had evidently not yet been weaned.

PUP ABSOLUTELY DEPENDENT UPON ITS MOTHER'S MILK.

It would necessarily follow from these considerations that the fur-seal pup is dependent upon its mother's milk for nourishment throughout the entire season and until its departure with her from the islands. This fact, taken in connection with the killing of nursing females at sea, is enough to settle the question of whether pups starve to death; but that there should be no mistake, the subject of starvation, as shown in its direct effect on the pups themselves, received special attention, and may be here considered somewhat in detail.

---

[1] See fuller discussion in Mr. Lucas' paper on the Feeding of the Seals. Part III.

CHAPTER XIII.

THE STARVATION OF PUPS.

THE COUNT OF STARVED PUPS.

The fact of the death of pups by starvation has long been noted, and for several seasons prior to 1896 partial enumerations of deaths supposed to be from this cause have been made. In the light of the early mortality due to the ravages of Uncinaria, which was found to have occurred prior to August 1, and consequently prior to the beginning of pelagic sealing, these figures were unsatisfactory, as they plainly confused the two causes of death. The earlier mortality has already been referred to and is discussed in detail by Mr. Lucas in his treatment of the general subject of mortality among the seals.[1]

At the time of the count of early dead pups between August 8 and 14 a few were found to have plainly starved. It is probable that some of these in the later days of the count were the first victims of pelagic sealing. A mother taken at sea on the 1st day of August might have been absent for some time, and her pup would naturally succumb within a shorter period than would be required for one more recently fed. The majority of the early deaths from starvation, however, were undoubtedly caused by separation of mother and pup by the wandering away of the latter when very young or by the death of the mother from accidental causes on the rookeries. A considerable number of dead cows were found on the rookeries, whose pups would naturally starve unless otherwise killed.

THE BEGINNINGS OF STARVATION.

The first direct evidence of the destructive work of pelagic sealing was seen in 1896, at the time of the count of live pups on Kitovi rookery, August 15. In counting the live pups they were separated into pods and allowed to run off in narrow lines to make counting possible. The weaklings naturally fell behind, and a group of from three to six starving pups followed in the wake of each pod. The victims of starvation could from this time on be seen in increasing numbers as the rookeries were daily inspected. The following notes on the starvation of pups are extracted from the daily journal of the commission.

NOTES ON STARVING PUPS.

In the first stages of starvation the doomed pup was to be recognized by a growing thinness. The ordinary pup is plump and fat, and its sides stick out with milk while its mother is on land. A thin pup might, of course, mean only a hungry one, which would recover itself in a few days after its mother's return. If the mother did not return the pup continued to grow thinner. A premature grayness began to show about the eyes and mouth. The eyes assumed a wide and staring look, giving the animal a hunted appearance.

---

[1] Paper on "Causes of Mortality," by Mr. Lucas. Part III.

THE HUNGRY PUP.

While the pup was merely hungry, it called frequently for its mother. It hung about the water's edge as if awaiting her there. It would even follow a wet cow back for a distance from the water, but, on being repulsed, it would return to its position. In one or two instances starving pups were seen to attempt to nurse sleeping cows, but never with success.

While their strength remained the starving pups played about as usual with their healthy companions; always, however, with an effort. They went into the water, and that they swam farther at times than their strength warranted was evident from the fact that occasionally they landed to die on the rocks at considerable distances from the rookeries to which they belonged. Thus two pups came ashore in the little cove across the neck from Zoltoi and died there in 1896.

THE BREAKING DOWN.

After the first stage of sharp hunger was passed the little animals seemed to weaken physically. They lay about on the rocks, sometimes sleeping, but always easily startled. When aroused, some would run away, crying in terror; others would turn at bay and bite savagely at the boots of the disturber, perhaps only to fall down helpless the next instant. In crossing the sand flat of Tolstoi, which was deserted by the living seals in September, a dozen or more of these gaunt little specters would start up from among the dead and stumble away, crying piteously.

One day, on the "death-trap" gully of Zapadni, a little sleeping starveling was aroused with difficulty. When it caught sight of the intruder it fell in a fit of terror, then stumbled off in a frantic manner, only to fall in convulsions, which ended in unconsciousness. This pup was about to die. It was as thin as a shadow.

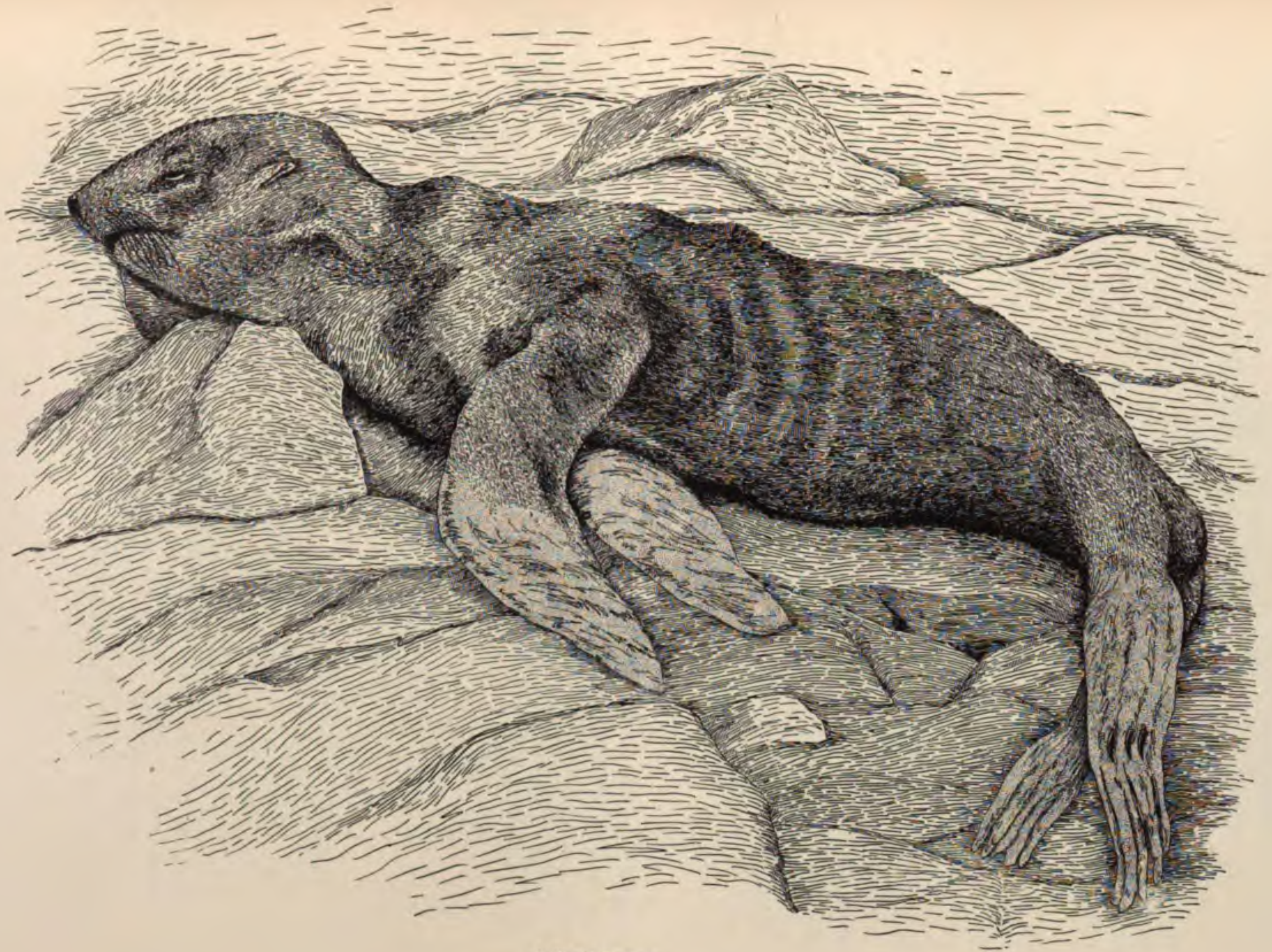
THE DEATH OF THE STARVELING.

When undisturbed, the starving pups in the last stages showed little evidence of pain. They looked utterly miserable, but indifferent and stolid. Their healthy companions occasionally attempted to play with them, but they either resented the interference or else ignored it. For the most part they were left to themselves. Toward the end they slept most of the time. This sleep merged into unconsciousness and torpor, from which they could not be awakened. Death finally came after a brief period of convulsive shuddering and gasping, in which the animal bit the ground and voided quantities of black, tarry fæces

DIFFICULTY IN DISTINGUISHING EARLY DEAD PUPS.

It was not possible at the time of the first count of dead pups in August to remove the bodies from the rookeries, and it was believed then that when the time came for counting the starved pups it would be possible to distinguish between the earlier and later dead. As the season advanced, however, it became evident that it would not be possible to make the distinction. Those dying in September could easily be separated from those which died in July, but no distinction could be drawn between those which died between the 1st of August and the 10th and those which died between the latter date and the 20th of August. When the count of starved pups was made about October 1 it was necessary, therefore, to count every carcass to be found at that date. From the total thus counted those dead before the middle of August were deducted to determine the number of additions which had resulted from starvation.

Of the details of this count a full record will be found in the daily journal and need not be repeated here. A total of 20,331 dead bodies were found on St. Paul Island and 897 on St. George. As against this total of 21,228 dead pups found in October, 11,045 were found in August, which, being deducted, left 10,183 pups shown by the actual count to have died of starvation.



A STARVED PUP.

Drawn from nature by Bristow Adams.

MANY EARLY DEAD PUPS DISAPPEARED.

In considering this count, however, several facts must be noted. It was found that a large number of the pups originally counted in August had wholly disappeared or been reduced to loose bones. This was particularly true on the sandy areas and where the dead lay in the route of the living seals as they passed back and forth to the sea. An effort was made to establish a correction for this loss, and 20 per cent[1] of the original number counted in August was fixed upon as likely to cover as nearly as could then be determined bodies which had so disappeared. Making allowance for this correction the total number of starved pups, as shown by the enumeration, would be increased to 12,392.

STARVING PUPS.

It was further evident from the outset that all the pups about to die of starvation had not yet died. It was impossible, however, to delay the count longer, and so, to overcome this new difficulty, an effort was made to count the starving pups among the healthy ones as they were driven from the rookery preparatory to the counting of the dead. The best estimate, which was a very unsatisfactory one, gave 1,546 as the number of pups whose appearance indicated that they were certain to starve. This number was doubtless very inadequate, as later observations on the rookeries in the same season showed that pups continued to starve until as late as the 20th of October, twenty days after the count was completed on St. Paul Island. Making, however, the addition of the dying pups just mentioned, as shown by the actual count, we have the number of deaths justly chargeable to starvation increased to 13,930.

THE WORK OF THE FOXES.

Another fact in connection with the actual count must be noted. On the Island of St. George, as already indicated, the total number of dead pups found in October was 897. In August the number found was 735. On some of the rookeries of this island, however, a much smaller number of dead was found in October than was found in August. The condition of the St. George rookeries was so peculiar that we may give here in detail both counts. They are as follows:

DEAD PUPS, ST. GEORGE ISLAND.

Rookery.	Dead pups, August, 1896.	Total dead pups, October 6, 1896.
North	259	145
Staraya Artel	135	194
Zapadni	199	527
East	112	15
Little East	31	16
Total	736	897

---

[1] The investigations of 1897 show clearly that this estimate of 20 per cent to cover the disappearance of dead bodies between August and October is far below the facts. Our experiences with Kitovi and Lukanin in 1897 would indicate that 50 per cent would not have been an excessive estimate. Many of the carcasses are washed away in the storms. Every one on which the skin is broken is quickly reduced to bones by the gulls and foxes. Furthermore, many bodies are necessarily overlooked as they lie hidden among the rocks.

The explanation of this condition of things is that on the rookeries of St. George the blue foxes,[1] of which there are many, had eaten all the pup carcasses without exception. The final count had to be made simply by skulls, or spinal colums, or such parts of the animals as could be positively identified.

RECONSTRUCTION OF ST. GEORGE ESTIMATES.

It is unnecessary to remark that these figures for St. George can not be used as they stand. Some sort of estimate must be made to take their place. No fairer basis for such an estimate exists than to apply to the rookeries of St. George the ratio of dead pups found in October on St. Paul. On this island the ratio of dead pups found in October to the total number estimated to have been born was 11.19 per cent.[2] This would necessitate the addition of 1,362 pups to make the conditions of St. George comparable with those on St. Paul. This amount, together with 150 pups which were removed from the rookeries of both islands during the breeding season for purposes of dissection, makes the total death rate subsequent to the middle of August, and directly chargeable to starvation, aggregate 16,019.[3]

THE DETAILED ESTIMATE.

This total, as will be seen by the explanations already given, is not entirely satisfactory, but it is a real one so far as it goes, and fully 12,000 of it is an actual count, the accuracy of which can not be questioned. The following table will give in detail the statistics of the estimate:

---

[1] In Mr. Macoun's report for 1896 this undoubted fact, which he saw with his own eyes, is needlessly questioned. If the foxes, as was the fact, had completely destroyed the 897 carcasses which he counted, it is begging the question to assume, as he does, that they, aided by the elements, could not have destroyed the 1,362 additional pups necessary to make the conditions of St. George agree with those of St. Paul.

[2] This percentage is computed on the original census of 1896, not on the revised figures substituted in 1897.

[3] A strong effort has been made by Professor Thompson and by Mr. Macoun in their reports of 1896 to weaken the force of these definite results regarding the starvation of pups. Not finding it possible to deny the fact of starvation or its importance, they have endeavored to minimize its effects by insisting that the causes of early mortality continued into and were at work in the period of starvation. Nothing could be more misleading than this. The early causes of death are Uncinaria, trampling, starvation through early separation from the mother, drowning, accidents. All these have to do with the weakness and helplessness of the very young pups, and must necessarily cease with the close of the breeding season. The pups die from or outgrow the worm before September 1. In fact, this cause is practically inoperative after August 20. Pups are only trampled in the first few days after birth, and they are only lost from their mothers, if at all, at this time. They certainly do not drown after they have learned to swim, which they do by the middle of August. The period of death from starvation lasts from August 15 to October 20. The causes of the early and later mortality were absolutely distinct, and that the latter was due practically without exception to starvation needs no demonstration to those who made the count of the dead and dying pups on the rookeries of St Paul in October, 1896.

Pup statistics—summary.

Rookery.	Total born.[a]	Dead.		Starved.	Starving.
		August.	October.		
ST. PAUL ISLAND.					
Kitovi	6,049	109	609	500	42
Lukanin	4,450	205	579	374	27
Lagoon	2,484	78	316	238	51
Tolstoi	14,439	1,895	2,449	554	191
Zapadni	17,648	3,095	4,395	1,300	154
Little Zapadni	4,200	134	693	559	64
Zapadni Reef	3,862	104	327	223	18
Gorbatch	9,142	712	1,878	1,166	126
Ardiguen	652	2	78	76	8
Reef	15,258	950	2,786	1,836	300
Sivutch Rock	1,907	50	284	234	31
Polovina	6,673	635	1,555	920	55
Little Polovina	1,363	47	119	72	22
Vostochni	27,148	1,808	3,313	1,525	329
Morjovi	7,773	485	950	445	109
Total	123,048	10,309	20,331	10,022	1,527
Addition of 20 per cent for loss between August and October counts				2,061	
Starving pups to be added as starved				1,527	
Addition for bodies taken for dissection				150	
Total starved				13,760	
ST. GEORGE ISLAND.					
North	6,809	259	145	762	7
Staraya Artel	2,269	135	194	253	3
Zapadni	5,509	199	527	617	4
East	4,086	112	15	457	4
Little East	1,350	31	16	151	1
Total	20,023	736	897	[b]2,240	19
Starving pups added as starved				19	
Total				2,259	
Grand total for both islands	143,071	11,045	21,228	16,019	1,546

[a] These are the figures of the original census of 1896 as published in the preliminary report of that year.

[b] The figures herein given for starved pups on the rookeries of St. George are estimates based upon the conditions of St. Paul.

STARVED PUPS IN 1897.

The investigations of the season of 1897 have made the count of dead pups in 1896 seem still less satisfactory. It may be said that the dead pups lie concealed among the rocks, and as they quickly wear away under the action of the elements and the trampling of the living animals they are not easily seen in the hasty inspection, which alone is possible in counting them. A good illustration of the probable inadequacy of the counts of dead bodies is shown by the results on Kitovi rookery. A count of this breeding ground, made with a good deal of care on the 3d of August, disclosed 126 dead bodies. When a week or ten days later the carcasses were actually gathered up and removed from the beach, the closer inspection disclosed 202 dead. This inadequacy of the counts of dead pups in 1896 is, however, of such a nature as to make the case all the stronger, because it leaves an under. rather than an over. estimate.

THE REMOVAL OF THE EARLY DEAD.

In the work of the present season a distinct step in advance was made in the enumeration of the starved pups. One element of confusion in last year's count resulted from the difficulty in distinguishing between the early and the later dead. To obviate this the pup carcasses on Kitovi and Lukanin rookeries were carefully removed on August 12, before the starvation from pelagic sealing began. Frequent counts of the dead, as they accumulated from and after the 12th, were kept up until the 10th of September, and the accessions, all plainly due to starvation, were found to be fairly constant from day to day. These counts will be found in the daily journal, under date of September 6 and 10.

On October 15 a count by Colonel Murray of the dead on these two breeding grounds gave a total of 1,057. These had died after August 12, and may be taken as a very exact measure of the contribution of these two rookeries to the general quota of death caused by pelagic sealing.

THE ESTIMATE OF STARVED PUPS, 1897.

There were in round numbers about 9,500 pups born on Kitovi and Lukanin rookeries in 1897. The number starved was therefore about 11 per cent of the birth rate. Applying this percentage to the total birth rate of the islands, the total death rate from starvation in 1897 must have been approximately 14,000. In 1896 the percentage of females taken in Bering Sea was 84. From the greater scarcity of males this year and the closer killing practiced on the islands, we are justified in assuming that the percentage for this year could not have been below 90 per cent. This would give a total of about 15,000 females killed. The difference of 1,000 will account for the small proportion of virgin two-year olds, and the adult cows in the pelagic catch, which had already lost their pups through natural causes.

THE IMPORTANCE OF THE FIGURES.

These data regarding the results of starvation are very important, and from them we can review our findings of last year. Applying a proportionate relation of starved pups to the pelagic catch of 1896, we find that the estimate for last year should have been about 24,000 instead of 16,000.

It is not desired, however, to press either of these calculations too closely. The percentage of the two rookeries counted may be slightly too high for the other rookeries. It certainly is too high for those rookeries on which the early mortality is great.

THE DESTRUCTIVE EFFECTS OF PELAGIC SEALING ESTABLISHED.

But the mere matter of the number of pups which starve is not important. The essential thing is that a very large number of pups do starve. This is settled beyond cavil. As we know the pups are wholly dependent upon their mothers' milk for nourishment until fully a month after pelagic sealing ceases, it follows necessarily that the pup dies as a result of the mother's death, if it has not already died from other causes. That more than 16,000 pups, which had otherwise escaped accidents on the rookeries in 1896, and about 14,000 in 1897 died of starvation is sufficient proof of the destructive effects of pelagic sealing. This artificial and added source of loss among the young pups is all the more impressive when taken in connection with the previous loss which they suffer from natural causes.

THE CUMULATIVE EFFECT OF PELAGIC SEALING.

We are now ready to consider finally the full effects of pelagic sealing on the fur-seal herd. It is apparent that a large proportion of the fur seals taken at sea are females; that every female above the age of 2 years is pregnant, and that when taken in Bering Sea she has a pup dependent upon her whose death results from her own.

Using an average of all the data available, the proportion of females in the pelagic catch is about 80 per cent, or, to be on the safe side, and for the sake of ease in computation, we may consider it to be 75 per cent.

THE TOTAL EFFECT OF PELAGIC SEALING.

In the earlier discussion of the pelagic catch we found that a grand total of 988,047, or approximately 1,000,000 seals, had been taken at sea since 1868 from all the herds of the North Pacific. With this data at hand we may make the following tabulation of the losses thus suffered by the fur-seal herds of the Pribilof and Commander islands:

Loss in all waters through pelagic sealing, 1868–1897.

Animals actually secured (in round numbers)	1,000,000
Animals shot, but lost (undetermined).	
Unborn pups destroyed with females (75 per cent of above)	750,000
Nursing pups starved (proportion of females killed in Bering Sea)	180,000
Total	1,930,000

Though the second item in the above enumeration is not and can not be determined, it is nevertheless an important one and must be borne constantly in mind. During this period it is significant to note, as bearing upon the proportion of the sexes at sea, that approximately 3,000,000 males were killed on land during the equivalent period.

THE EFFECT SINCE 1883.

But inasmuch as land killing was at its maximum during the first fifteen years of this period, and pelagic sealing only nominal, the effect of the latter will be more strikingly apparent if the comparison be based upon the results since 1883, when the pelagic catch in Bering Sea began. This computation for the Pribilof herd alone would be as follows:

Loss to the Pribilof herd through pelagic sealing since 1883.

Animals actually secured	536,000
Animals shot, but lost (undetermined).	
Unborn pups destroyed with females (75 per cent of above)	402,000
Nursing pups starved	180,000
Total	1,118,000
Total land killing covering the same period	842,000

THE EFFECT UNDER THE PARIS REGULATIONS.

From these figures we begin to appreciate the effect which pelagic sealing has had on the fur-seal herd. At the risk of repetition it is worth while to carry this computation one step further and see what has been the condition of things since the regulations of the Paris Tribunal went into effect. The following is the result:

Loss to the Pribilof herd through pelagic sealing since 1894.

Animals actually secured	187,000
Animals shot, but lost (undetermined).	
Unborn pups destroyed with females (75 per cent of above)	140,000
Nursing pups starved (proportion of females killed in Bering Sea)	122,000
Total	449,000
Total land killing, same period	80,000

It is scarcely necessary to add anything to this arraignment of pelagic sealing. In its known effects, coupled with the absence of any other known cause, we must adjudge it the efficient cause of the decline. The fur-seal herd has declined and is declining solely because of the slaughter of its gravid and nursing females and the premature destruction of their offspring. It naturally follows that these figures constitute an equally striking and conclusive condemnation of the regulations of the Paris award.

CHAPTER XIV.

EFFECTS OF PELAGIC SEALING ON THE SEAL-SKIN INDUSTRY.

Thus far we have considered solely the effect of pelagic sealing on the fur-seal herd. It is worth while, however, to look at the effect also on the general seal-skin industry. In former days the supply of seal skins came in part from the southern hemisphere; but these herds are practically extinct, except for a few thousand skins taken at certain protected points. The fur-seal skin industry is therefore practically dependent for its existence on the preservation of the seal herds of the North Pacific.

INTERNATIONAL INTEREST IN THE FUR-SEAL HERDS.

The United States and Russia on the one hand, and Great Britain on the other, are vitally interested in this industry, the former nations because of their property rights in the seals and the revenue they should derive from the safe and legitimate killing of males on land; the latter nation through the interest of her citizens in the city of London engaged in the dressing and dyeing of seal skins. Practically all the seal skins of the world are prepared in London. Practically all the seal skins of the world are supplied by the herds frequenting the Pribilof Islands and Commander Islands and belonging to the United States and Russia.

UNITED STATES INTERESTS.

Speaking more directly for the interests of the United States, it may be said that during the first twenty years of its possession of the islands our Government derived an annual revenue of $317,500 in tax paid by the lessees of the rookeries. During this period the annual quota averaged 100,000. With a like quota and the more advantageous terms of the present lease with the new company, the United States ought now to be receiving a revenue of $1,000,000 annually from its fur-seal herd; but instead it receives an income scarcely sufficient to meet the cost of patrol in the enforcement of the regulations for the protection of the herd.

The United States has also other interests than its revenue under the lease. For example, it derives a revenue from the importation of prepared skins brought from London to the American market. Seventy-five per cent of the dressed seal skins find their ultimate market in the United States. On the 75,000 skins which American dealers should now be importing were conditions normal, the United States should be deriving an annual income of $375,000. In the manufacture and sale of seal-skin garments American citizens have an important interest.

Putting these various elements together, it will be seen that under normal conditions the United States should be enjoying to-day an income of about $1,375,000[1] from its fur-seal herd, whereas it receives less than one-fifth this amount.

---

[1] Case of United States Fur Seal Arb., Vol. I, p. 272.

RUSSIAN INTERESTS.

The interest of Russia lies solely in the revenue which she should derive from the taking of seal skins on her islands. Her citizens are not to any extent engaged in the sale and manufacture of the garments made from the skins.

THE INTEREST OF GREAT BRITAIN.

Great Britain's interest in the fur-seal-skin industry is next in importance to that of the United States. There was invested in the city of London, in 1892, a capital of $5,000,000 engaged in the work of dressing and dyeing seal skins.[1] Between 2,000 and 3,000 skilled workmen were employed in the business. This capital and labor, on account of their highly specialized nature, can not be advantageously turned into other channels. The extermination of the fur-seal herds means the ruin of the seal-skin industry.

THE CANADIAN PELAGIC SEALING INTERESTS.

It is worth while here to contrast the value and importance of the so-called industry which is opposed to these several interests. In the report of the British commissioners for 1892[2] we find this statement: "The estimated value of the British Columbian vessels employed in sealing, with their equipments, as they sailed in 1892, was $359,000." This valuation may be looked upon as an extreme one, and the vessels have deteriorated since. Mr. T. T. Williams[3] gives the value of the Canadian sealing fleet of 24 vessels in 1889, including outfits, as $173,350. The average value per vessel would according to this be approximately $7,200. For the 49 vessels in 1892 the average valuation would be $7,300. A recent estimate by Capt. C. L. Hooper[4] of the value of 19 of these vessels engaged in sealing in 1896, but not in 1897, was in round numbers $45,000, which would give an average valuation of $2,400 per vessel, a figure probably much nearer present conditions.

VALUATION OF THE FLEET.

Applying this later valuation to the entire sealing fleet of 1896—21 American and 66 British vessels—we have as opposed to the important interests of the United States and Great Britain a capital of not to exceed $208,000. This should be contrasted with the capital of $5,000,000 invested in the preparation of the seal skins in London and with the revenue of $1,375,000 a year which the United States should by right be enjoying. Taking the average number of men employed per vessel in 1889 and 1891, we find that for the fleet of 87 vessels in 1896 there was a total of 2,000 white men and Indians. With these should be contrasted the 2,000 or more skilled workmen engaged in dyeing and dressing the seal skins in London.

The pelagic fleet in 1896 took, all told, about 70,000 skins, worth $7 apiece, or a gross income of about $490,000. It is not easy to estimate the expense of fitting out such a fleet, but if we take out of this gross earning of a little less than half a million the wages of 2,000 men for from three to six months, in addition to the provisions for the voyage, the profit of the pelagic investment is small. In fact, it is not a matter of profit at all, but one of loss. The true nature of the business was plain in 1897, when only 38 vessels as against 87 in 1896 engaged in sealing.

---

[1] Case of United States Fur Seal Arb., vol. I, p. 273.

[2] Proc. Fur Seal Arb., vol. 6, p. 35.

[3] Fur Seal Arb., vol. 3, p. 499.

[4] See Appendix.

PELAGIC SEALING A SUICIDAL INDUSTRY.

This effect of pelagic sealing upon itself is interesting and important. The true character of the industry can be seen from the following tabulation of its product under the regulations of the Paris award:

Pelagic catches, 1894–1897.

	North-west Coast.	Bering Sea.
1894	24, 101	31, 585
1895	12, 122	[a] 44, 169
1896	14, 417	29, 500
1897	7, 857	16, 464

[a] In 1895 there were 59 vessels engaged in sealing, as against 37 in 1894.

Not only is pelagic sealing a destructive and wasteful industry, but it is suicidal in its nature. It is at best but an insignificant industry. It threatens the destruction of vastly more important interests and with them its own interests. Pelagic sealing preys upon its own capital. The more successful it is the quicker will come its ruin. Its bankrupt condition to-day is clearly shown in the declining catch and the withdrawal of its vessels.

THE EFFECT OF THE DECLINING CATCH.

As the business of pelagic sealing is, so is the fur seal-skin trade. Pelagic sealing has until this year in a measure supplied the deficiency occasioned by the decrease in the land catch. The combined land and sea catches of 1897, however, number all told only about 60,000 skins. The pelagic catch alone in 1894 furnished 140,000 skins.

The uncertainty and especially the inadequacy of the supply of skins has seriously affected the seal-skin market, which as a result is badly demoralized. The effect of the shortage of supply in seal skins makes it necessary to substitute other furs. This tends to drive the seal skin out of fashion, as the substitute becomes itself fashionable. Concerning this phase of the question we may quote the words of one of the best informed dealers in fur-seal skins who said in a recent interview:

> The seal skin will probably never go out of fashion so long as the supply is fully adequate to the demand. But if the supply were to be cut off or reduced too low, it would be necessary to supply the demand from other furs and seal skins would go out of fashion. What is worse, with the change of fashion the men now employed in curing the skins would have to seek other lines of work and would be lost to the business. When it was again attempted to bring the seal skin into fashion, it would be necessary to train up a new set of men. For many years after the resumption of the curing of seal skins the results would be so poor and unsatisfactory that they could not be sold to anyone familiar with the present grade of skins. It is not likely therefore that, if the seal skin was lost to fashion now, it could be brought back within the present generation.

THE LEGALITY OF PELAGIC SEALING.

Such is the nature of pelagic sealing, the sole cause of the threatened destruction of the fur-seal herd, the sole obstacle which stands in the way of its restoration.

Much has been said of the legality of pelagic sealing, and to this we take no exception. Pelagic sealing is perfectly legal, but this legality was fixed by a tribunal which was so confused by false testimony and ignorant and worthless affidavits, that, while attempting to formulate measures for the protection of the seals, it legalized the very cause of their destruction. But the whitewash of respectability which was thus put upon pelagic sealing can not hide its true character. Judged by its methods and results, it is merely a species of legalized barbarism. Pelagic sealing is simply a public nuisance which can now only be disposed of by an international agreement.

THE PROHIBITION OF PELAGIC SEALING TO AMERICANS.

It is with a great sense of relief that we find ourselves able to record the recent action of Congress in the prohibition of the practice of pelagic sealing by our own citizens and the exclusion of skins of females from our markets. This step should have been taken long ago. It must be remembered that until the passage of this law[1] Americans as well as Canadians have been engaged in slaughtering the fur seals. Of the 87 vessels which took seals during the season of 1896, 21 were American. And not only have our citizens helped to destroy our own herd, but they have crossed the Pacific and have been instrumental in depleting the herd of friendly Russia. American enterprise has also had the leading part in the practical extermination of the fur-seal rookeries of the Kuril Islands, belonging to Japan.

PELAGIC SEALING DISTINCTLY A CANADIAN INDUSTRY.

Henceforth, however, our hands are clean and we can with dignity and assurance urge that other nations take steps to put an end to the business. Pelagic sealing—with its slaughter of gravid females and the starvation of their dependent young, with its waste of a noble and valuable animal life, with its threatened destruction of varied and important commercial enterprises and of the sole source of supply of a commodity of utility and value to mankind—is from this time on distinctly a Canadian industry and under the fostering care of Great Britain. If she permits its continuance, the odium must rest with her.

---

[1] See text of this law in Appendix II to the report.

CHAPTER XV.

THE RESULTS OF THE PARIS AWARD.

A. THE ARBITRATION.

Before taking up the question of what benefits have resulted to the fur-seal herd from the regulations formulated by the Paris Tribunal of Arbitration, it will be worth our while to review briefly the history of the fur-seal controversy which led up to the Tribunal.

THE ORIGIN OF THE FUR-SEAL QUESTION.

It was not until after the extension of pelagic sealing into Bering Sea, first by unlawful raiding of the rookeries, begun about the year 1879, and afterwards, by the invasion of the summer feeding grounds of the herd in 1880, that there came to be a fur-seal question. The first recorded pelagic catch in Bering Sea is that of the schooner *City of San Diego* in the year 1883.[1]

THE SEIZURE OF VESSELS.

In 1886 a large fleet of sealing vessels was engaged in Bering Sea, and of these a number were seized by the United States vessels detailed to guard the islands, among them three Canadian schooners, the *Carolina*, the *Onward*, and the *Thornton*. The fleet was still further increased in the following year and more seizures were made. Against the seizure of Canadian vessels Great Britain protested, and from the resulting correspondence the fur-seal question, as we now know it, arose.

EFFORTS TO SECURE INTERNATIONAL COOPERATION.

Realizing the danger which threatened its fur-seal herd in the rapid expansion of pelagic sealing, and especially in its extension to the waters adjacent to the breeding grounds, the United States, in 1887, opened up a correspondence with the Governments of Germany, Sweden and Norway, Russia, Japan, and Great Britain with a view to such international cooperation as should secure the protection of the herd. Secretary Bayard, in his letter to these several Governments, called attention to the fact that "the unregulated and indiscriminate killing of the seals in many parts of the world has driven them from place to place, and by breaking up their habitual resorts has greatly reduced their numbers." He predicted a similar result to the seals of the northern hemisphere, unless steps were taken for their protection. Nothing came of this correspondence.

PROPOSED MEASURES OF PROTECTION

In the year 1888 Secretary Bayard proposed to Great Britain that by mutual arrangement among the nations interested there should be established a close season for the fur seals beginning with April 15 and ending with November 1, and also a closed zone covering the waters of Bering Sea between the one hundred and sixtieth degree of west longitude and the one hundred and seventieth degree of east longitude, north of the fiftieth degree of north latitude. This proposition was assented to by Lord Salisbury on behalf of Great Britain, with the stipulation, in deference to the wish of the Government of Russia, that the provisions of such an arrangement should be extended to the waters of Bering Sea in which the Commander Islands are situated and also to the Sea of Okhotsk. This extension was agreed to by the United States.

---

[1] See foot note to page 142.

OBJECTION BY CANADA.

When the negotiations looking to an agreement on this basis were on the point of a successful termination they were suddenly brought to a standstill by objections on the part of Canada. Great Britain declined to further consider the matter without the consent of Canada, which could not be obtained.

THE RENEWAL OF NEGOTIATIONS.

In view of this state of affairs United States vessels in 1889 renewed the seizure of sealing vessels. This action had been waived the preceding year in view of the favorable progress of the negotiations. In the spring of 1890, Great Britain suggested that the tripartite arrangement which was dropped in 1888 be resumed. This suggestion was accompanied by a change on her part of the original proposition. It was now asked that an inquiry be made by a mixed commission of experts, and that pending the results of their labors pelagic sealing should be prohibited in the waters of Bering Sea, the sea of Okhotsk, and adjoining waters, during the months of May and June and during the months of October, November, and December, and at all times within a radius of 10 miles of the breeding islands.

THE COUNTER PROPOSITION UNSATISFACTORY.

To appreciate the nature of this counter proposition it must be borne in mind that the summer months excepted from this close season are the only ones in which the breeding seals are regularly in Bering Sea. Secretary Blaine, who had succeeded Secretary Bayard, in declining this proposition, called attention to its radically different nature from the one originally accepted. The unreasonableness of the proposition seemed, in Mr. Blaine's estimation, sufficient warrant for breaking off the negotiations, but as he intimated they were continued by the United States in the hope of reaching a better understanding.

PROPOSALS FOR ARBITRATION.

After much fruitless correspondence in an effort to secure the suspension of pelagic sealing pending further negotiations, Mr. Blaine, on the part of the United States, submitted a series of propositions which, in his opinion, might furnish the basis of an arbitration looking to the final settlement of the matters in dispute. These propositions were six in number. The first five provided for a determination of the questions of jurisdictional rights in Bering Sea exercised by Russia and transferred to the United States, and of the property rights and rights of protection which the United States possessed over the seals when beyond the ordinary territorial waters about the islands.

In the event of an adverse decision for the United States on these legal questions, the final proposition provided that the court of arbitration should take up a consideration of the rules and regulations necessary for the proper protection of the herd when at sea and beyond the jurisdiction of the United States. These propositions, after amendment and discussion, were finally accepted as the basis of an arbitration and were embodied in a treaty between the United States and Great Britain, signed on February 29, 1892, and duly ratified. This treaty is printed in Appendix II of this report.

THE MODUS VIVENDI.

While the discussion of the treaty was under way, and in view of its probable consummation, a modus vivendi was agreed to in June, 1891, which closed Bering Sea to pelagic sealing and limited the land catch on the islands to a nominal figure for the support of the natives depending upon the fur seals for food. The promulgation of this measure was too late in the season to make it possible of enforcement, the pelagic fleet having already gone to sea. After the signing of the treaty in the following year this modus vivendi was renewed and continued in force until the conclusion of the labors of the arbitration convention. The text of the agreement will be found in Appendix II.

THE JOINT COMMISSION OF INQUIRY.

In the progress of the discussion leading up to the convention of February, 1892, it was decided that a commission of experts representing each Government should visit the seal islands and report on the habits and condition of the fur-seal herd with a view to the information of the arbitration convention. To expedite matters this commission was tentatively designated and entered upon its work in the summer of 1891, being officially recognized after the treaty was finally agreed to in the spring of 1892.

THE TRIBUNAL OF ARBITRATION.

In accordance with the provisions of the treaty of 1892 the Tribunal of Arbitration duly convened at Paris in February, 1893, and concluded its labors on the 15th of August. Its decision of the legal questions involved being adverse to the United States, the Tribunal proceeded to formulate regulations for the protection and preservation of the fur seals.

JOINT REPORT OF THE COMMISSION.

Before taking up a detailed consideration of these regulations it will assist us in our understanding of them to consider briefly the results of the investigations on which they were based. The joint commission of investigation representing the United States and Great Britain, after its visit to the islands in the summer of 1891, met at Washington in the spring of 1892, and after much discussion found itself unable to agree upon any facts of importance beyond the general proposition that the fur-seal herd had largely declined and that man was responsible for the decline. Accordingly, each commission of investigation submitted a separate report to its Government. These reports became the basis of each nation's contention before the Tribunal regarding the condition and habits of the fur seals.

THE AMERICAN CONTENTION.

The American contention was in brief that the decline of the herd was due to pelagic sealing; that pelagic killing was indiscriminate, the female sex predominating in the catch; that these females when killed off the Northwest Coast in the spring were gravid, and when killed on their feeding excursions in Bering Sea were nursing, and left dependent pups upon the rookeries whose death resulted from starvation.

THE BRITISH CONTENTION.

The British contention, on the other hand, held that the proportion of females in the pelagic catch was comparatively unimportant and composed chiefly of barren cows; that nursing females did not leave the islands while their pups were dependent upon them; that in case they did so leave and were killed, their young could be nursed by other cows or could subsist on food procured from the sea. Having thus disposed of the contention of the United States, a counter proposition was set up that land killing as practiced on the islands rather than sea killing was responsible for the decline of the herd.

THEIR COMPARATIVE MERITS.

It is not the intention at this point to discuss the comparative merits of these contentions. They have been fully treated in the preceding pages. It is sufficient here to say that subsequent events have conclusively proved the essential truth of the American contention and the falsity of the British counter claims. From the conflicting evidence brought before the Tribunal, it is not strange that the regulations formulated by it—which are a blind effort at compromise—are an utter failure for the purpose for which they were intended.

B. THE REGULATIONS OF THE AWARD.

The regulations are published in full in Appendix II to this report, together with a more extended account of the Tribunal of Arbitration itself. We may here briefly summarize the provisions of these regulations as follows: (1) the establishment of a closed zone about the Pribilof Islands of a radius of 60 miles; (2) a closed season from the 1st of May to the 31st of July; (3) the restriction of pelagic sealing to sailing vessels and undecked boats and canoes; (4) the requirement of a special license and flag by sealing vessels; (5) a record of the place, number, and sex of seals taken; (6) a proficiency requirement on the part of those engaging in the business; (7) the exemption of Indians on the Northwest Coast from the provisions of the regulations; (8) a provision for the reconsideration of the regulations at the end of five years if found to be inadequate. These regulations were put into operation by appropriate legislation both by the United States and Great Britain in the spring of the year 1894.

THE MINOR PROVISIONS.

The minor provisions of the regulations we need not dwell upon. Sailing vessels are doubtless the only ones which can profitably be used in the business. The license and flag are no doubt useful, but immaterial. The prohibition of firearms in Bering Sea is a provision wholly in the interests of the sealers. The proficiency requirement borders on the ridiculous. Exemption of the Northwest Coast Indians is just and proper, but the discrimination against the Aleuts on the shores of Bering Sea is unjust. These requirements, one and all, have absolutely no bearing upon the welfare of the seals.

The requirement regarding the record by the sealing captains of the sex of animals taken was a useful one, as providing a means for the securing of valuable data bearing upon the effects of the regulations. The method was, however, unfortunate, and for the very natural reason that it could not be expected that the sealers would take the trouble to make honest reports which must be injurious in the highest degree to their business. The sequel shows, as we have already pointed out, that they can not be depended upon for correct information.

THE SIXTY-MILE ZONE.

The remaining provisions are more vital. The 60-mile zone about the islands has a positive value in keeping vessels at such distance from the rookeries as to make successful raiding impossible. When we have said this regarding the protected zone, we have stated its only importance. The feeding grounds of the seals lie far outside of its limits. On the journeys to and from the grounds the seals do not loiter much in the protected area. A protected zone, to be of any value, should cover and include the feeding grounds to which the nursing females resort.

THE CLOSE SEASON.

The provision for a close season is of more importance, though even its value is by no means great. It shuts off that catch which was formerly made in May along the southern shore of the Alaskan Peninsula and the Aleutian Islands. This catch was unusually destructive, because the females were growing heavy with pup. Under the regulations these animals, which have escaped from the hunters off the coast in March and April, are allowed to continue their way in peace to the islands. During June and July they are protected, but as they then spend a large part of the time on shore the protection is not so important as it seems.

REGULATIONS ADAPTED TO WORK OF SEALERS.

As if suited to the needs of the sealers and against those of the seals, the sea is opened on the 1st of August at the time when, under the necessity of furnishing nourishment for their growing offspring, the mother seals are forced to spend the greater part of the time on the feeding grounds. To understand fully the destructive force of this month of August, it is only necessary to observe that in the spring the herd is constantly moving on, and there is more or less difficulty in locating it. In Bering Sea the seals frequent certain feeding banks regularly, coming and going at intervals. If a seal is not taken at her first trip, other opportunities will occur on her second and subsequent trips. The sealer has only to wait for her, and in the meantime go on taking other seals.

The close season, therefore, offers little protection to the female fur seal. It permits her to escape at one place and time only to allow her to be taken at another and more favorable time and place. It saves her from death before the birth of her offspring only to leave her liable to be killed after it is born and to subject her offspring to death by starvation.

To the pelagic sealer the close season offers no impediment and entails no loss. He can rest assured that the seals he is prevented from taking in the North Pacific will be more easily taken in Bering Sea in August, when the storms of the early summer are over and the conditions in every way more favorable. In the meantime he is given opportunity to refit his vessel, or he may cross over to the Asiatic side at the beginning of the close season and prey upon the Commander herd before returning to Bering Sea in August.

On the whole, it is difficult to see how a more comfortable and convenient set of regulations could have been prepared had the pelagic sealers themselves drawn them up. It is difficult to see how they could be made more destructive to the herd if that had been their deliberate intent.

THE COST OF ENFORCING THE REGULATIONS.

It is not enough, however, that these regulations legalize the destruction of the herd. They are necessarily maintained at a tremendous cost. The Government of the United States paid for the maintenance of its patrol in the North Pacific and in Bering Sea during the period from April to October, 1896, the sum of $176,380.16. The cost to Great Britain for her share in the patrol was smaller, but yet a considerable sum.

THE FAILURE OF THE REGULATIONS.

It is scarcely necessary to state that the regulations of the Paris Award have proved a signal failure. As has already been shown, the herd has continued to decline steadily under them. The herd suffered its greatest loss under the first year of their operation, when 61,000 animals were taken at sea. In the year 1896, of the catch taken in Bering Sea, 84 per cent were females, practically all of them pregnant and having nursing pups dependent upon them. Between the seasons of 1896 and 1897 the breeding herd suffered a diminution of from 12 to 15 per cent, notwithstanding the fact that the pelagic catch had largely declined through the exhaustion of the herd. To this it is only necessary to add that under the rigid patrol which has been maintained the regulations have been strictly enforced and fully complied with. No further condemnation of these measures for the "protection and preservation of the seals" could be expected.

THE REDEEMING FEATURE OF THE REGULATIONS.

The one redeeming feature about the regulations is the final provision for their reconsideration and revision. The only difficulty here is that the trial period fixed at five years was too long. One season would have been sufficient to test them. They were calculated to show their quality at once. As a matter of fact it was clearly demonstrated by the recorded catch of the first season of their operation that they had stimulated rather than retarded pelagic sealing and consequently had heightened the decline of the herd. That a fleet of 87 vessels in the first year of the operation of the regulations should have been able to take 61,000 seals, whereas 115 vessels, in 1891, before pelagic sealing was interfered with, took but 59,000, was clear enough evidence that the regulations had only altered matters for the worse.

THE PURPOSE OF THE ARBITRATORS.

The final provision of the regulations has another feature of importance—it defines the purpose of their formulation. This is "the protection and preservation of the fur seals." It is fortunate that the Tribunal of Arbitration placed this matter on record, as otherwise its work in framing these measures would be without justification and its own sincerity could be called into question. Truth enough to condemn every feature of the regulations was placed before the Tribunal, but the real issues were so thoroughly confused by the statements made in opposition that the outcome was a matter of chance. This is the only explanation which can be offered for the irreconcilable difference between the evident purpose and the actual achievement of the regulations.

THE OBLIGATION TO PROTECT AND PRESERVE.

This statement of the purpose of the Tribunal has another important bearing. It leaves no doubt that the obligation to protect and preserve the fur seals was laid upon the two nations concerned by their acceptance of the decision. From all this it must follow that at the close of the trial period of five years, if not before, the United States and Great Britain must take up seriously the reconsideration of these regulations, and by their emendation or by the substitution of more adequate measures provide for what was plainly the object of the Tribunal of Arbitration, namely, the protection and preservation of the fur-seal herd.

CHAPTER XVI.

SUMMARY OF CONCLUSIONS.

Before passing to a consideration of the final topic, the remedy for the condition of the herd, we may give the following brief statement of the chief facts concerning the fur-seal herd which have a bearing on its future protection and preservation. This statement, while in a sense a summary of the preceding discussions, was originally prepared by Messrs. Hamlin and Jordan, the American delegates to the recent Fur-Seal Conference at Washington, for the use of the conference. A few of the estimates here given may be open to difference of opinion, but in general the accuracy of these statements has not been questioned and can not be:

STATEMENTS OF FACT.

The delegates of the United States present for the consideration of the meeting of experts the following statements of fact regarding the condition of the fur-seal herd resorting to the Pribilof Islands:

1. Since the year 1885 the fur-seal herd, as measured by its breeding females, has steadily declined in numbers at a rate varying from year to year.

2. The best available measure of this decline is found in these facts:

(*a*) During the period between 1871 and 1885 no difficulty was experienced in obtaining each year 100,000 male seals of recognized killable age by the 20th of July.

(*b*) In 1896 only 30,000 killable seals were taken after continuing the driving until July 27, and in 1897 only 20,890 were taken after continuing the driving until August 11.

3. From this and other data it would appear that the herd of breeding females on the Pribilof Islands in the years 1871–1885 must have been about five times as great as at present, or from 600,000 to 700,000 in number.

4. The natural life of the female fur seal is estimated at from ten to fifteen years. Assuming thirteen years as an average, each female would have ten years of breeding life. If this be true, 10 per cent of the breeding females die of old age each winter in addition to the unknown losses from other causes. The stock of breeding females is recruited solely by the accession each year of 3-year-old cows.

5. The natural death rate among the young fur seals, especially among the pups, is very great. At present about two-thirds die from natural causes before they reach the age of 3 years, or killable age for the males and breeding age for the females.

6. The chief natural causes of death among the pups are:

(*a*) Ravages of the parasitic worm, *Uncinaria*, infesting sandy breeding areas.
(*b*) Trampling by fighting or moving bulls and cows.
(*c*) Starvation of pups strayed or separated from their mothers when very young.
(*d*) Ravages of the great killer (*Orca*).
(*e*) Drowning in the storms of winter.

The natural losses from other causes are relatively small.

7. Counts and estimates show that the number of breeding females bearing pups on the rookeries of St. Paul and St. George in 1896 was about 157,000 and in 1897 about 130,000.

8. On certain rookeries pups were counted during both seasons. Where 16,241 were found in 1896, 14,318 were found in 1897, a decrease of about 12 per cent. The harems on all the rookeries were counted during both seasons. In 1896 there were 4,932; in 1897, 4,418, a decrease of 10.41 per cent. The cows actually present on certain rookeries at the height of the season were counted both seasons. Where 10,198 were found in 1896, 7,307 were found in 1897, a decrease of 28.34 per cent.

9. It is not possible to state absolutely the decline in the actual number of breeding cows from 1896 to 1897, but it is not far from 15 per cent.

10. The number of killable seals taken on the islands in 1897 shows a decrease of about 30 per cent from the number taken in 1896. This represents approximately the decrease in the 3-year-old breeders which entered the rookeries in 1897, the number of males and females born being practically equal.

11. Land killing is not now a factor in the decline of the herd, and has not been since the islands came into the possession of the United States. It has not caused injury to the breeding herd either by undue reduction in the number of males or by impairing their virility, or in any other way.

12. Land killing has tended to increase the size of the breeding herd by the reduction of the number of adult bulls and their consequent fighting, which results in the destruction of females and pups.

13. No appreciable part of the decline of the herd is due to illegal killing or killing in defiance of the regulations of the Paris award.

14. The reduction in the breeding herd has been due to the killing of females at sea, with the resulting starvation of nursing pups and the destruction of unborn pups.

15. Pelagic sealing necessarily involves indiscriminate killing of males and females. The greater proportion of the animals taken in the pelagic catch are females. The statistics for the American catch, obtained by expert examination in the custom-houses, show an average of 78 per cent for the years 1894, 1895, and 1896. The examination of pelagic skins in London confirms this percentage.[1]

16. The natural increase of the breeding herd is about 16⅔ per cent each year, being one-half of the surviving 3-year-olds. The natural death rate from old age each year is not far from 10 per cent. The death rate of adults from other causes can not be accurately estimated. The killing of females by the hand of man therefore can not reach 6⅔ per cent of the total number each year without involving the decline of the herd. If the herd is to be restored, the killing of female seals should not be permitted.

17. As neither land killing nor sea killing now yields a profit for the money invested and for the money spent in protection, the fur-seal herd is therefore, from a commercial point of view, virtually destroyed. But this has not involved the biological destruction of the herd. Under wise protection it may regain its former numbers.

---

[1] To this may be added the testimony of Mr. Halkett, obtained since the original preparation of this statement, showing the percentage of females in the Bering Sea catch for 1896 to be 84 per cent.

18. In our judgment all facts in any way vital to international action regarding the protection and preservation of the fur-seal herd are now in the possession of both Governments.

19. These facts show that the herd has largely declined from its original condition and from its condition in 1891 and in 1894; that it is still declining, and that the cause of the decline is the slaughter of females involved in pelagic sealing.

20. The regulations of the Paris award have proved ineffective to protect and preserve the herd. They have not prevented its decline, which has continued and must continue in spite of them. They can not bring about a restoration of the herd, as they permit the killing of females in numbers vastly in excess of their natural increase.

CHAPTER XVII.

THE REMEDY FOR THE DECLINE OF THE HERD.

We have thus covered the first three divisions of our subject. We have found the seal herd diminished to between one-fifth and one-sixth of its original size and still declining. The cause of this decline is simply and solely the slaughter of females at sea. The imminence of the danger thus threatened to the herd may be judged by the extent of the loss which has already been inflicted and by the fact that at the present time the herd is commercially ruined both on land and at sea. The regulations provided for the protection and preservation of the herd are utterly ineffective.

REVISION OF THE REGULATIONS NOT ADEQUATE.

The fourth division of our inquiry must therefore be short. It follows, of course, that some radical change is necessary. This can not be brought about by alterations in the present regulations or the substitution of new ones. It is not a question of the regulation of pelagic sealing, but of its abolition and the cessation of all traffic in the skins of females. The nature of the problem is such that the killing of seals at sea in any form and under any restrictions that can be made effective is wholly incompatible with the preservation and restoration of the herd.

PELAGIC SEALING CAN NOT EXIST WITHOUT THE KILLING OF FEMALES.

It is impossible to distinguish the sex of the animals at sea and so exempt the females. It is immaterial whether the animal is shot or speared, so long as it is killed. It makes no difference whether the female is killed when heavy with young on the migrations or whether she is left to bring forth her young and is then killed, leaving the young to starve. The herd could be commercially ruined in the single month of August on its feeding grounds in Bering Sea, even if all other sealing were prohibited. If Bering Sea were fully closed, the concentration of the operations of the fleet off the Northwest Coast would be sufficient to maintain the continued, though perhaps slower, decline of the herd. So long as pelagic sealing exists in any form or at any time or place, females will be killed, and their continued slaughter means the ultimate destruction of the herd, biologically as well as commercially.

THE TOTAL PROHIBITION OF PELAGIC SEALING THE ONLY REMEDY.

In a word, there is no remedy for the present decline of the herd, nor hope for its restoration and preservation, except in the absolute and permanent prohibition of pelagic sealing.

CHAPTER XVIII.

THE FUTURE OF THE FUR-SEAL HERD.

A RECONSIDERATION OF THE QUESTION.

With the season of 1898 will close the five-year trial period of the regulations of the Paris Tribunal of Arbitration. These regulations were, as we have seen, formulated for the "protection and preservation of the fur seals." In the treaty of 1892, under which the arbitration was convened, "the preservation of the fur seal in, or habitually resorting to," Bering Sea was expressly designated as part of the object of the convention. Furthermore, in the declarations which the tribunal made to the respective governments concerned we find that "in view of the critical condition to which it now appears certain that the race of fur seals is reduced" it was recommended that all killing of seals, whether on land or at sea, be prohibited for an agreed period of years. From these references, it must be clear that the avowed purpose and intention of the Tribunal of Arbitration was to accomplish the protection of the fur-seal herd. It is equally clear that the responsibility for carrying this purpose was placed upon the nations concerned in the arbitration and which accepted its decision.

A BASIS FOR THE REOPENING OF THE SUBJECT.

In approaching a reconsideration of the regulations the two nations have now a much clearer knowledge of the conditions surrounding the problem. As a result of the recent conference of American, British, and Canadian fur-seal experts at Washington, an agreement as to facts was reached sufficiently broad and conclusive to show the true condition of the herd, the cause of its decline, and the remedy. This joint agreement will be found in full in Appendix II of this report. We may here briefly summarize its conclusions:

FINDINGS OF FACT.

THE DECLINE.

First, it is found that the fur-seal herd has declined largely from its condition in 1884 down to the date of the inspection of the rookeries in 1897. This means that the herd has continued to decline under the regulations. The decrease is stated as equal to from two-thirds to four-fifths of its maximum size. Between the seasons of 1896 and 1897 the rate of decline is found from the most reliable data to be between 9 and 12 per cent. For this same period the pelagic catch has itself declined fully one-half.

SLOW RATE OF INCREASE IN THE HERD.

Second, it is found that the natural death rate among the seals, especially the young, is high, so that but one-half to one-third of those born attain the age of three years. This means that the rate of increase in the fur-seal herd under the best of conditions is slow.

MALES CAN BE KILLED WITH IMPUNITY.

Third, it is agreed that owing to the polygamous habit of the fur seal, coupled with an equal birth rate of the sexes, it is possible to remove a large number of males with impunity, and that the operations of land killing as now conducted do not affect the virility of the males or fail to leave an adequate supply of male life for breeding purposes. As land killing has always been confined to the males, and as its operations are to-day what they have been since the herd came into American control, except in so far as they have been improved, this means that land killing is not and has not been a factor in the decline of the herd.

EXCESSIVE DESTRUCTION OF FEMALES.

Fourth, it is agreed that pelagic sealing involves the killing of males and females alike without discrimination, as the sexes coexist in the sea; that the proportion of females taken in the pelagic catches of recent years has been from 62 to 84 per cent; that the females so taken are in large part pregnant and nursing, their death involving the death of their offspring. It is agreed that this abstraction of breeding females, which in recent years has been largely in excess of the natural increment of the herd, has gone too far, and has caused the diminution found in the herd. In other words, put in plain terms, this means that pelagic sealing has been the cause of the decline in the fur-seal herd.

COMPROMISE FINDINGS.

It is also agreed that a limited number of females, within the natural increment of the herd, may be killed without causing actual diminution. It is found that in the rapid decline of the pelagic catch there is a tendency toward equilibrium at this point of safety. It is further found that as a species the fur seal is far from being exterminated, and that under the present conditions of protection such extermination is not probable. These statements are self-evident truths, though wholly irrelevant to the question. We have already discussed this supposed equilibrium. The supposed safety of the herd as a species is made to depend upon the maintenance of a costly patrol, which would naturally be abandoned by the United States if it saw no hope of the restoration of its industry.

THE HERD COMMERCIALLY RUINED.

Finally, it is agreed that the herd in its present condition yields but an inconsiderable return either to the lessees of the islands or to the owners of the pelagic fleet. In a word, it is agreed that the fur-seal herd has declined until it is commercially ruined both on land and at sea; that land killing is not responsible for this decline, and that pelagic sealing is responsible.

PELAGIC SEALING INCOMPATIBLE WITH PRESERVATION OF HERD.

We have shown clearly enough in our discussion of the methods and conditions of pelagic sealing that the continuance of the industry in any form is incompatible with the preservation and restoration of the fur-seal herd. In taking up a reconsideration of the matter there is but one thing to do, namely, abolish pelagic sealing; in other words, remove the cause of the decline. This is the task which must confront the United States and Great Britain as well at the close of the season of 1898.

THE SKIN OF A FEMALE TO BE CONTRABAND.

As to ways and means for accomplishing the desired end we have nothing to offer. We are glad to be able to call attention to the action of our Government in the passage of the bill forbidding the citizens of the United States to engage in pelagic sealing. We may suggest that should Great Britain enact and enforce a similar law this would end the matter. If the fur-seal herd is to be preserved its breeding females must be protected from slaughter. To make the skin of a female fur seal a contraband article, subject to seizure and confiscation when brought into a port of a civilized nation, will protect her from slaughter.

THE PROPOSED EXTERMINATION BY SLAUGHTER ON THE ROOKERIES.

We have had occasion, in the preliminary reports of the commission, to denounce a method of settling the fur-seal question, which has already received more attention than it merits, namely, the extinction of the herd by the slaughter of the animals on their breeding grounds. We trust that the day is passed when such a proposition would be tolerated. The measure is an abominable one, without a single redeeming feature. It would condense into one wholesale act all the objectionable features in pelagic sealing, against which we, as a nation, have been from the first contending; and it would lodge upon us alone and for all time the odium for the extermination by a barbarous method of a noble race of animals. The United States can not afford to shirk her responsibility for the protection and preservation of the fur seals by any such makeshift. It remains for the two great nations interested in the welfare of the fur-seal herd, and under obligation to look after that welfare, to find a way of settling the problem that shall be effective and honorable.

THE IMPORTANCE OF THE FUR-SEAL HERD.

We have already had occasion to refer to the importance of the fur-seal herd as a property investment, adding to the wealth and comfort of mankind. Great Britain and the United States both share in the profits to be derived from the legitimate product of the herd, the former through the interests of her citizens in the preparation of the seal skins for the market, the latter through the revenue she derives under her lease.

In its present condition the fur-seal herd is sadly reduced. Under the expensive conditions of protection necessitated by the existence of pelagic sealing the profits of its product on land are eaten up. But even now, if the present expensive patrol could be waived, the return from the herd would be by no means insignificant. Under the quota of 1897 the revenue to the Government can not be far from $250,000, 5 per cent on an investment of $5,000,000.

A STRONG NUCLEUS REMAINS.

The nucleus of the herd which remains is strong and vigorous. Under proper conditions it will increase, and in fifteen or twenty years should equal its maximum condition. This would mean, under the present lease of the islands, a revenue in tax alone of $1,000,000 annually. But with proper protection the product of the herd from the start would increase and grow as the herd grows, becoming greater each year, until normal conditions were again reached.

CHAPTER XIX.

RECOMMENDATIONS.

Assuming that the fur-seal herd will ultimately receive that protection which it deserves, it is in order for us to make certain recommendations and suggestions which naturally grow out of our investigations of the past two seasons.

INADEQUACY OF PAST KNOWLEDGE.

We have had occasion in our present discussion to point out the faulty and misleading character of much of the information which has been published concerning the fur-seal herd. It is not necessary to recur to it here. We must, however, note the fact that between the first two investigations instituted by the Government a period of fifteen years elapsed, during which there was absolutely no provision made for obtaining information concerning the real condition of its breeding herd.

THE AGENTS OF THE GOVERNMENT NOT INVESTIGATORS.

After the investigations of Mr. Elliott, covering the period from 1872 to 1876, the herd was given over to untrained men, who were not prepared to conduct the investigations necessary to understand the nature of the trust they were set to guard. To make matters worse, these men were speedily replaced by others equally inexperienced as soon as, by reason of practical contact with the affairs of the islands, they began to acquire some knowledge of their duties. The result is that the herd passed unnoticed from its state of maximum prosperity into one of rapid decline, and was reduced to one-half its size before the Government or its agents were made aware of the fact.

THE FAILURE TO UNDERSTAND THE CONDITION OF THE HERD.

How little the situation was understood in 1889 by the officers of the Government may be seen from the fact that in that year the agent in charge of the islands recommended that the quota of killable seals be reduced from 100,000 to 60,000, when, as a matter of fact, the hauling grounds were only capable of furnishing 20,000, as the year 1890 disclosed.

Through lack of experience in dealing with animals, or because influenced by the crude notions of the natives, the agents of the Government, early in the history of the herd, established the tradition that the seals were virtually wild animals, which must be left severely alone if they were not to be driven away. Accordingly, they instituted stringent rules against the visitation and molestation of the breeding grounds. These rules were not only enforced against the natives and casual visitors, but for the most part they were so rigidly adhered to by the agents themselves that they too remained in practical ignorance of the real condition of the herd.

THE WILD-ANIMAL POLICY.

This policy, which systematically treated the fur seals as wild animals, bore fruit later on, when the theory of exclusive ownership in the seals became vital to the interests of the Government. This theory, being wholly incompatible with its management of the herd, was legally untenable. It is safe to say that had the United States looked after its herd with the care and attention that a cattleman on the plains would bestow on his stock, the theory that ownership in the fur-seal herd must be shared with the pelagic sealer would not have been established. Had the United States in 1886, instead of seizing sealing vessels under a shadowy right of jurisdiction over the waters of Bering Sea, branded a mark of ownership upon each female, cleansed the rookeries from worm-breeding sands, and then seized the vessels that destroyed its property, it is probable that to-day there would be no fur-seal question.

LACK OF FAITH IN OUR OWN METHODS.

But so little attention had the Government paid to the condition of its herd and the results of its own methods of handling the animals, that it was possible in 1891, for those interested in maintaining pelagic sealing, to set up the counterclaim that our own methods were responsible for the depleted condition of the herd, and the Government found itself unable to successfully combat the charge. Indeed, it would seem that it was not itself assured of its own innocence, otherwise the useless repression of driving in 1894 and 1895, after the modus vivendi, is without explanation. In these years, after three years of rest, the full product of the hauling grounds should have been taken. Instead of this we find that the taking of seals was limited to two drives from each hauling ground in the season, this change being made with the avowed purpose of avoiding injury and disturbance to the rookeries.

WASTEFUL MANAGEMENT.

We must again, at the risk of repetition, call attention to the financial loss which the management of the fur-seal herd in the first twenty years of our control involved. From the published records of the islands we find that no less than 154,000 animals, either too young to furnish skins or whose condition was such that the skins were not available, were killed and their pelts wasted. Had these animals been killed in the proper season or been allowed to grow to the proper age, the revenue in tax alone from these skins would have been $460,000.

Why this waste was permitted we can not understand unless it be that the matter was never properly urged upon the attention of the Government. It seems certain to us that had the agents in charge of the islands ascertained the uselessness and wastefulness of this proceeding it would never have been allowed to continue. This money would have paid five times over for competent and systematic investigation of the herd from the day it came into control of the United States to the present time. It would in all likelihood have averted its depletion and all the expensive litigation and friction which the fur-seal question has involved.

THE TWO VITAL MATTERS YET UNKNOWN.

There are two important matters which the Government ought to understand in order to handle its fur-seal interests intelligently, and these two vital facts it has not yet ascertained. They should have received first attention, and they should have been determined twenty years ago. These are: First, the proportion of males necessary to attend to the needs of the breeding female herd; second, the proportion of young seals which survive to the age of 3 years.

Without knowing the real facts in regard to either of these matters, the Government assumed to fix a definite quota and to maintain it through twenty years. As a matter of fact, we know from the history of the herd that for the greater part of this time this quota was too small and that a large additional product of male life was wasted. For another part of the time this quota was too great, and this led to waste of another sort by involving the premature killing of the yearling and 2-year-old bachelors. Since 1894 the Government, acting on the advice of its agents, who clearly did not understand the situation, has each year assumed to fix in advance what quota should be taken.

THE FIXING OF THE QUOTA.

Let us take as a concrete example the quota of 1897. As a matter of fact, the number was left indefinite and at the discretion of the commission, so that the full product of the hauling grounds was taken in so far as that was possible. But suppose the quota had been fixed at 15,000. In that case the loss to the Government in tax under its lease would have been $65,000; or had it been fixed at 20,000, the loss would still have been $9,000. One or the other of these figures would certainly have been chosen had the advice of anyone relying on such data as were available in 1896 been taken. The quota actually taken in 1897 was 20,890.

So long as mere personal judgment is trusted in these matters any quota that may be fixed in advance must be a very conservative one. The Government must avoid, on the one hand, the too close killing of the male life. On the other hand, it must see to it, at least in the present depleted condition of the fur-seal catch, whether on land or at sea, that the full product of its bachelor herd is gathered and utilized. It must therefore face this problem: If in fixing the quota the figure be placed too low, say 1,000 below the number of skins which could be taken with impunity, the Government loses $10,000 in tax, and the lessees an equal, if not greater, amount. If the margin of uncertainty is greater or less, the loss is proportionately increased or diminished. It would manifestly be disastrous were the limit of safety systematically exceeded by a like number.

QUESTIONS WHICH REQUIRE CONTINUOUS AND EXPERT STUDY.

The questions involved in the safe and intelligent gathering of the annual quota are of such a nature that they can not be determined in a single season, nor in two, possibly not definitely in five; nor can the matter rest when they are once determined. The investigations of the past two seasons have, however, laid the foundation for this work. If the census of the breeding herd, begun in 1896 and improved upon in 1897, is continued for two or three seasons it can be made practically exact. The birth rate of the present season is accurately enough established. If, as can safely be done, the full product of the hauling grounds is taken from now until the season of 1900, it can then be determined with reasonable accuracy, from the quota of 3-year-old males of that year, what percentage of the young survive to killable and breeding age.

FIXED QUOTA NOT DESIRABLE.

With this fact once determined, the rate of the herd's increase is known, and also the size of the quota that can safely be taken. From any given birth rate, then, the quota of the third year following can be very definitely determined. It will probably never be wise to again fix a hard and fast quota, but a maximum and minimum limit within close range can be fixed, and this should serve the purposes of the lessees as well as of the Government.

THE PROPORTION OF MALES NEEDED.

The second problem of importance, namely, the proportion of males needed on the rookeries, is perhaps more easily determined. It will, however, be well to verify it by continued observations and experiments. The investigations of the past two seasons show clearly that with the present breeding herd of 130,000 cows 4,500 adult bulls is a number entirely adequate, even though twice that number are ready and willing to do service. But the mere fact that the rookeries are so evidently overstocked with bulls makes it desirable that this subject should be further studied before final judgment is taken.

The importance of the second problem, however, does not lie in its solution, but in its practical application. Knowing the proportion of males necessary for breeding purposes and the proportion of males which survive to killable age, the practical question is, how to see that the necessary reserve is set aside each year to replenish the breeding stock as it deteriorates through old age and other causes.

MINOR PROBLEMS.

We have mentioned these two important problems which directly concern the taking of the product of the herd. They are absolutely essential. There are other questions of a minor nature, such as the more definite determination of the movements of the seals, and their ages. There is also an important work to be done in the improvement of the breeding grounds, their extension, their drainage, and the purging of places infested with the parasitic worm.

THE HERD SHOULD BE PLACED IN CHARGE OF A NATURALIST.

It is not necessary to go into greater detail. We have probably said enough to make clear the wisdom of the one important recommendation which the present commission strongly urges upon the Government at this time. This is the placing of its fur-seal herd permanently in charge of a competent naturalist and practical man of affairs, whose business it shall be to visit the islands each year in the breeding season and to study the condition of the herd and ways for its improvement; to determine the size of the quota which shall be taken, and supervise its taking; in short, to make the needs, possibilities, and limitations of the fur-seal herd his life study. By such a course the Government can hope to have at hand at all times that expert advice and assistance that have been so signally lacking in the past and which are so essential to the proper administration of its future interests.

This superintendent of the herd should not take the place of the present agents, but should be an additional officer, and his duties should lie wholly with the herd. The agents, as at present appointed, should continue to deal with the natives and with the lessees. Their only connection with the herd should be as executive officers to carry out the suggestions and plans of the superintendent.

We have gone into detail in this matter simply for the purpose of emphasizing its importance. What such a man should or should not do must be left to his judgment, the fact of his competency being assured. His study and ingenuity will undoubtedly show other or more important ways in which he might serve the interests of the Government.

Under proper protection the fur-seal herd may be expected to become again in time a valuable interest of the Government. Its condition to-day, as a result of the investigations of 1896 and 1897, is very thoroughly known. With this knowledge as a foundation, and assisted by the excellent survey, which has just been completed, of the breeding grounds, it should be possible henceforth for the Government to be at all times possessed of complete and accurate knowledge as to the condition of the fur-seal herd. It is to be hoped that the proper steps will be taken to insure this result.

APPENDIX I.

STATISTICS PERTINENT TO THE PRECEDING DISCUSSION.

TABLE OF DAILY KILLINGS OF FUR SEALS FOR ALL PURPOSES ON THE PRIBILOF ISLANDS FOR THE YEARS 1875, 1880, 1886, AND 1889 TO 1897, INCLUSIVE.

INTRODUCTORY NOTE.

The complete table of daily killings for the period 1870 to 1889, prepared by Col. Joseph Murray, having been published in Senate Doc. No. 137, Seal Life, Part I, 1896, and recently republished in "Seal and Salmon Fisheries and General Resources of Alaska," House Doc. No. 92, 1898, it has not seemed necessary to repeat it in full here. From this table we have taken the record for the years 1875, 1880, 1886, and 1889. The first of these years is intended to illustrate the normal driving in the period of equilibrium during the years 1871 to 1880. The record of the year 1880 is given to show that no radical change had yet occurred. With it is contrasted the record of 1886, when, the killable seals became scarce through the decline of the breeding herd, and it was necessary to multiply the drives and hauling grounds driven from to secure the necessary quota of skins. The record of 1889 is introduced to form a contrast to that of 1890. The driving in neither year shows normal conditions. The record for 1890 and following is a continuation of Colonel Murray's set of tables, taken from the official records of the islands. In the names of the rookeries we have used the spelling adopted in the present report.

ST. PAUL ISLAND, 1875.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1875.			1875.		
Jan. 1[1]	Northeast Point	25	June 1[2]	English Bay and Southwest Bay	1,201
Feb. 10	.....do	6	1	Tolstoi	203
16	.....do	9	5	Zoltoi and Tolstoi	692
17	.....do	16	7	Zoltoi and Reef	711
May 7	Southwest Bay	498	7	Southwest Bay	1,560
10	Northeast Point	9	7	Northeast Point	27
14	.....do	20	10	English Bay, Southwest Bay, Tolstoi	1,456
18	Reef	143	12	Reef and Zoltoi	631
24	.....do	657			
31	.....do	492			

---

[1] Seals taken in this and subsequent years prior to June 1, when the regular sealing season began, were for natives' food. Such of the skins as were of suitable grade were accepted and became a part of the regular quota.

[2] Where, as in this initial drive of the season, two or more names are joined, it means that adjacent or convenient hauling grounds were united in a single drive. Thus Zoltoi is always driven with Reef, because the route of the longer drive crosses Zoltoi hauling ground. In like manner Tolstoi, Middle Hill, and English Bay are so situated as to be conveniently driven together.

ST. PAUL ISLAND, 1875—Continued.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1875.			1875.		
June 12	Northeast Point	4,065	July 14	Tolstoi and English Bay	1,810
14	Tolstoi and English Bay	739	15	Lukanin and Kitovi	748
16	Halfway Point	2,115	16	English Bay	2,700
16	Tolstoi and Reef	707	16	Zoltoi	1,205
17	Lukanin	452	17	Northeast Point	7,439
18	Southwest Bay, English Bay	3,303	22[1]	Zoltoi	557
19	Zoltoi	1,363	28	.....do	159
19	Northeast Point	5,252	Aug. 4	.....do	235
22	Tolstoi	1,830	14	Kitovi	192
22	Zoltoi	1,150	21	Zoltoi	159
24	English Bay	3,009	Sept. 2	.....do	210
25	Lukanin	262	12	.....do	143
26	Northeast Point	7,349	21	.....do	146
26	Southwest Bay	4,047	30	.....do	153
28	Reef	1,527	Oct. 12	.....do	115
30	Zoltoi and English Bay	3,927	Nov. 5	.....do	172
July 2	Lukanin, Kitovi, Zoltoi	2,534	17	Tolstoi	1,990
3	Northeast Point	5,024	29	Southwest Bay	24
6	Zoltoi and Lukanin	1,248		Pups killed for food[2]	3,745
8	English Bay	3,370	Dec. 2	Northeast Point	15
9	Tolstoi and English Bay	2,093	4	Tolstoi	694
10	Lukanin and Kitovi	1,125			
10	Northeast Point	5,937		Total	94,960
13	Zoltoi	1,565			

ST. GEORGE ISLAND, 1875.

1875.			1875.		
June 1	Staraya Artel	302	June 30	Staraya Artel and North	1,412
9	.....do	256	July 5	East	717
11	East	177	7	Staraya Artel and North	1,019
14	Staraya Artel and North	307	12	East	1,073
16	East	358	14	North	676
18	Staraya Artel and North	334	17	.....do	177
19	Southwest Bay	1,294		Killed for food	1,500
23	East	666			
24	Staraya Artel and North	540		Total	[3] 11,500
28	East	692			

[1] The killings subsequent to July 17, at which time the quota of the season was filled, were for natives' food, and, as in the case of the killings before the regular season began, the skins so taken when suitable were included in the quota of the following year.

[2] Prior to the year 1891 it was customary each fall to allow the killing of a certain number of young male pups by the natives for food. Before leaving the islands in the fall the pups become very fat, and as their diet is exclusively milk up to that time, the meat was dearly prized by the natives. The method employed in taking these pups was to drive them up from a given rookery, sort out the males and drive them to the killing grounds for slaughter. Their skins were of no value. The wasteful practice was discontinued after 1890. For details regarding this matter, reference may be made to extracts from the log of St. Paul, Part II, under date of November in any season.

[3] St. George had furnished 27,000 male seals up to the close of 1873, when the quota was arbitrarily reduced to 10,000. The driving of this year was adapted to the reduced quota. In 1887 the quota of St. George was raised to 15,000, and the driving increased accordingly.

ST. PAUL ISLAND, 1880.

Date.	Rookery.	Total males killed.
1880.		
May 14[1]	Southwest Bay	209
22	Reef	225
22	Northeast Point	19
June 1	Reef	216
8	Southwest Bay	1,497
9	Reef	926
11	English Bay, Tolstoi	889
12	Southwest and English Bays	763
14	Halfway Point	1,204
15	Reef and Zoltoi	765
16	Zapadni and English Bay	990
17	Kitovi, Zoltoi, Reef	18
18	Tolstoi and English Bay	1,619
19	English Bay and Middle Hill	802
14 19	Northeast Point	5,279
21	Halfway Point	1,459
22	Kitovi, Zoltoi, Reef	1,035
23	Tolstoi and Middle Hill	1,702
24	Reef, Zoltoi, Kitovi	1,437
25	English Bay and Middle Hill	2,582
26	Kitovi, Zoltoi, Reef	1,062
21 26	Northeast Point	6,202
28	Halfway Point	1,516
29	Kitovi, Lukanin, Zoltoi	1,743
30	Tolstoi and Middle Hill	2,297
July 1	.....do	1,622
2	English Bay and Middle Hill	2,374
3	Kitovi, Zoltoi, Reef	1,386
3	Northeast Point	7,167
5	Halfway Point	789
1880.		
July 5	Lukanin and Kitovi	651
6	Tolstoi	1,[illegible]77
7	Tolstoi and Lukanin	1,654
8	Zoltoi, Reef, Lukanin, Kitovi	2,221
9	Tolstoi, Lukanin, Middle Hill	1,428
10	Zoltoi, Kitovi, Lukanin	1,221
5–10	Northeast Point	7,073
12	Zoltoi, Kitovi, Lukanin	817
13	Tolstoi and English Bay	1,763
14	Reef, Zoltoi, Lukanin, Kitovi	2,640
15	English Bay	1,834
16	Middle Hill and Lukanin	2,461
17	Zoltoi	534
28	Northeast Point	43
30	Halfway Point	228
31	Zoltoi	218
Aug. 11	.....do	253
19	.....do	160
28	.....do	189
Sept. 8	.....do	195
18	.....do	239
30	.....do	227
Oct. 12	Lukanin	260
25	English Bay	193
Nov. 2 3, 5, 6	Lukanin, Reef, Kitovi	4,410
Dec. 6	Reef	1,176
9	Southwest Bay	13
24	Northeast Point	82
Nov. 11	Middle Hill	270
29	English Bay	270
	Total	84,779

ST. GEORGE ISLAND, 1880.

1880.		
May 18	North	14
26	Staraya Artel	23
June 3	North	82
9	East	338
12	North and Staraya Artel	564
14	East	352
15	Southwest Bay[2]	738
17	.....do	254
17	North and Staraya Artel	559
19	East	599
19	Southwest Bay	223
21	North and Staraya Artel	1,183
22	Southwest Bay	518
23	East	814
25	Southwest Bay	839
25	North and Staraya Artel	1,322
28	East	1,770
29	Southwest Bay	846
30	Staraya Artel	808
July 1	North	392
2	East	956
2	Southwest Bay	961
5	North and Staraya Artel	515
1880.		
July 6	East	1,483
7	Southwest Bay	1,814
9	East	949
	During season perished on the drives[3]	28
16	North	72
17	Zapadni	7
20	.....do	8
28	North	60
Aug. 6	.....do	51
11	North and East	226
Sept. 1	North	40
2	Zapadni	35
27	North	47
Oct. 5	.....do	62
28	.....do	501
Nov. 1	.....do	765
9	Zapadni	30
18	.....do	10
Dec. 1	East	65
3	Zapadni	16
	Total	20,939

---

[1] The hauling ground here as elsewhere designated as Southwest Bay, is identical with Zapadni in later years. In like manner Halfway Point and the later name Polovina are synonymous. In each case one name is Russian and the other the English equivalent.

[2] Southwest Bay and Zapadni are the same rookery.

[3] A record was kept of the animals which were overcome by exhaustion, or accident, and had to be killed and skinned on the drive. For this season, involving the handling of 20,000 seals killed, to say nothing of those driven and rejected, the number lost seems to have been 28.

ST. PAUL ISLAND, 1886.

Date.	Rookery.	Total males killed.
1886.		
Jan. 21	Sea Lion (Sivutch) Rock[1]	84
29	Southwest Bay	49
May 5	Northeast Point	7
8	.....do	5
17	Southwest Bay and Reef	300
10–17	Northeast Point	49
29	Reef	153
June 4[2]	.....do	562
8	Tolstoi, English Bay, Southwest Bay	1,323
9	Halfway Point	299
10	Reef and Zoltoi	634
11	English Bay	214
14	Lukanin, Reef	427
14	Northeast Point	1,343
15	Southwest Bay	1,166
15	Northeast Point	1,116
16	English Bay, Middle Hill, Tolstoi	850
16	Northeast Point	585
17	Halfway Point	833
17	Northeast Point	761
18	Reef and Zoltoi	651
18	Northeast Point	376
19	English Bay, Middle Hill, Tolstoi	1,064
19	Northeast Point	371
21	Southwest Bay	1,891
21	Northeast Point	1,161
22	English Bay and Tolstoi	1,007
22	Northeast Point	659
23	Halfway Point	1,770
23	Northeast Point	955
24	Zoltoi	1,555
24	Northeast Point	498
25	Reef, Zoltoi, English Bay, Middle Hill, Tolstoi	2,158
25	Northeast Point	581
26	.... do	441
28	Southwest Bay	1,070
28	Northeast Point	926
29	English Bay, Tolstoi, Zoltoi	1,503
29	Northeast Point	794
30	Halfway Point	490
30	Northeast Point	1,056
July 1	English Bay and Tolstoi	1,319
1	Northeast Point	1.202
2	Southwest Bay	856
2	Northeast Point	566
3	Reef and Zoltoi	1,263
5	English Bay and Tolstoi	1,163
5	Northeast Point	1,180
6	Halfway Point	942
6	Northeast Point	866
7	Zoltoi, Reef, Lukanin	1,969
7	Northeast Point	1,187
8	Southwest Bay	1,466
8	Northeast Point	952
1886.		
July 9	English Bay, Middle Hill, Tolstoi	1,563
9	Northeast Point	636
10	Reef, Zoltoi, Kitovi, Lukanin	1,133
12	Halfway Point	1,044
12	Northeast Point	1,501
13	Southwest Bay and Southwest Point	1,442
14	English Bay and Middle Hill	1,074
14	Northeast Point	602
15	Zoltoi, Reef, Kitovi, Lukanin	1,957
15	Northeast Point	899
16	Halfway Point	937
16	Northeast Point	1,013
17	Southwest Bay and Southwest Point	2,057
17	Northeast Point	407
19	Reef and Zoltoi	2,312
19	Northeast Point	753
20	English Bay, Middle Hill, Tolstoi	3,140
20	Northeast Point	801
21	Halfway Point	1,476
21	Northeast Point	312
22	Southwest Bay and Southwest Point	2,015
22	Northeast Point	923
23	Reef, Zoltoi, Lukanin, Kitovi	8,147
23	Northeast Point	739
24	English Bay and Middle Hill	1,625
24	Northeast Point	658
26	Halfway Point, Southwest Bay, Lukanin, and Zoltoi	1,993
Aug. 3	Zoltoi	75
9	.....do	152
19	.....do	134
30	.....do	96
Sept. 6	.....do	148
17	.....do	146
29	Reef	148
Oct. 11	.....do	144
28	.....do	152
Nov. 5	.....do	768
6	Reef and Lukanin	445
8	Reef	900
10	.....do	711
22	....do	379
23	Tolstoi	289
Dec. 1	Reef	380
21	Tolstoi	191
	Total	88,085

---

[1] The killings on Sivutch Rock occur only at intervals in the winter or early spring when no seals are left on St. Paul. The natives go to the island in boats, killing the seals and bringing the carcasses home for food. No seals are killed on the rock in the breeding season.

[2] The relative number of drives between June 4 and July 26 in this year should be noted in contrast to the number required in 1880 between June 1 and July 17. The extension of the season of driving ten days is also significant.

ST. GEORGE ISLAND, 1886.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1886.			1886.		
May 18	East	39	July 14	East	888
28	North	102	15	Staraya Artel and North	712
June 8	Captured skins	4	19	Zapadni	663
14	Zapadni food skins	81	21	Staraya Artel and North	853
10	Staraya Artel, North, East	1,430	22	East	527
14	Zapadni	779	23	East and North	295
17	Staraya Artel, North, East	1,438	Aug. 2	Near (North)	14
21	Zapadni	843	2	....do	11
22	Staraya Artel and North	742	9	East	66
23	East	343	17	North	42
24	Zapadni	306	23	East	70
28	....do	288	Sept. 6	North	76
29	Staraya Artel and North	632	Oct. 26	....do	759
July 1	East	482	28	East	24
5	Zapadni	620	Nov. 8	North	527
6	Staraya Artel and North	503	13	East	3
7	East	650		Perished on drive	12
10	Staraya Artel and North	867			
12	Zapadni	745		Total	16,436

ST. PAUL ISLAND, 1889.

1889.			1889.		
May 22	Sea Lion (Sivutch) Rock	124	July 13	Southwest Bay	1,006
25	Reef	41	13	Northeast Point	793
28	....do	234	15	English Bay and Middle Hill	3,085
31	Northeast Point	133	15	Northeast Point	1,838
June 5[1]	Reef	201	16	Reef, Zoltoi, Lukanin	1,911
10	....do	120	16	Northeast Point	1,156
12	Tolstoi	947	17	Halfway Point and Lukanin	1,931
14	Zoltoi and Reef	762	17	Northeast Point	948
15	Southwest Bay	340	18	Lagoon, English Bay, Middle Hill	2,046
17	Halfway Point	895	18	Northeast Point	1,282
17	Northeast Point	1,054	19	Southwest Bay	2,017
18	English Bay, Tolstoi, Middle Hill	1,161	19	Northeast Point	834
18	Northeast Point	1,270	20	Reef and Zoltoi	1,913
19	....do	494	20	Northeast Point	243
19	Reef, Zoltoi, Lukanin	1,561	22	English Bay, Middle Hill, Lukanin	1,943
20	Southwest Bay	253	22	Northeast Point	350
21	Northeast Point	1,205	23	Reef, Zoltoi, Kitovi	1,122
22	English Bay, Tolstoi, Middle Hill	1,355	23	Northeast Point	740
24	Northeast Point	754	24	Halfway Point	1,384
24	Reef and Zoltoi	2,578	24	Northeast Point	616
25	Halfway Point and Lukanin	979	25	English Bay and Middle Hill	1,756
25	Northeast Point	1,407	25	Northeast Point	1
26	English Bay and Middle Hill	1,314	26	Southwest Bay	680
26	Northeast Point	441	26	Northeast Point	1,483
27	Southwest Bay	311	27	Zoltoi and Lukanin	1,105
27	Northeast Point	844	29	English Bay and Middle Hill	1,643
28	Reef, Zoltoi, Kitovi	1,349	29	Northeast Point	1,624
28	Northeast Point	479	30	Halfway Point	973
29	....do	335	30	Southwest Bay	615
29	English Bay and Tolstoi	1,038	31	Northeast Point	538
July 1	Northeast Point	1,200	31	Zoltoi	160
1	Reef, Zoltoi, Lukanin	1,023	Aug. 6	Lukanin	163
2	Halfway Point	834	14	Zoltoi	131
2	Northeast Point	968	22	....do	141
3	English Bay, Tolstoi, Middle Hill	1,841	31	Tolstoi	179
4	Reef, Zoltoi, Lukanin	1,706	Sept. 9	Zoltoi	141
4	Northeast Point	1,559	18	....do	110
5	Southwest Bay	1,255	25	....do	107
5	Northeast Point	1,524	Oct. 5	....do	120
6	English Bay, Tolstoi, Middle Hill	1,302	15	....do	103
6	Northeast Point	376	26	Lukanin	132
8	Reef, Zoltoi, Lukanin	814	Nov. 4	Zoltoi	1,169
8	Northeast Point	914	19	Tolstoi	1,460
9	English Bay and Tolstoi	1,314	21	Reef	347
9	Northeast Point	641	27	....do	192
10	Halfway Point	654	27	Zapadni	10
10	Northeast Point	800	30	Reef	240
12	Reef and Zoltoi	2,004	Dec. 11	Zapadni	243
				Total	87,394

---

[1] The driving in this season was not essentially different from that in 1886, except that it was continued until the 31st of July. That what was difficult in 1886 had not become an impossibility in 1889 was owing to the fact that in the latter year the size of skins to be taken was lowered, so that the younger bachelors down to the yearlings were taken. Even this resource failed in 1890.

ST. GEORGE ISLAND, 1889.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1889.			1889.		
May 22	North and East	60	July 22	Zapadni	500
June 4	East	156	23	North, East, Staraya Artel	628
10	Zapadni	207	24	Zapadni	279
17	.....do	244	25	North, East, Staraya Artel	1,430
18	Staraya Artel, North, East	773	27	.....do	942
21	East	176	28	Zapadni	568
22	North and Staraya Artel	284	29	North, East, Staraya Artel	515
24	Zapadni	596	Aug. 10	North	55
25	East and North	496	19	.....do	56
27	Zapadni	223	30	.....do	48
29	Staraya Artel and East	429	Sept. 7	East	64
July 1	Zapadni	167	21	.....do	50
2	North, East, Staraya Artel	275	30	North	33
5	.....do	418	Oct. 11	.....do	37
8	Zapadni	229	21	Staraya Artel	32
10	North, East, Staraya Artel	270	31	North	4
12	Zapadni	192	Nov. 6	.....do	606
13	North, East, Staraya Artel	667	12	.....do	477
15	Zapadni	371	25	Staraya Artel	61
16	North, East, Staraya Artel	1,028			
18	Zapadni	439		Total	15,225
19	North, East, Staraya Artel	1,140			

ST. PAUL ISLAND, 1890.

1890.[1]			1890.		
Jan. 27	Sea Lion (Sivutch) Rock	175	July 9	Southwest Bay	163
May 21	.....do	131	9	Northeast Point	271
28	Southwest Bay	119	10	Reef	378
June 6	Reef	116	10	Northeast Point	112
11	.....do	574	12	English Bay, Middle Hill, Tolstoi, Lukanin, Kitovi	633
13	Tolstoi	182			
16	Reef	317	13	Halfway Point	211
17	Northeast Point	16	13	Northeast Point	658
17	Halfway Point	167	14	Reef	104
18	Tolstoi and Middle Hill	274	15	English Bay, Middle Hill, Tolstoi, Lukanin, Kitovi	315
18	Northeast Point	78			
20	Reef and Lukanin	339	15	Northeast Point	245
20	Northeast Point	438	16	.....do	312
21	Southwest Bay	292	17	Polovina, Lukanin, Kitovi	372
21	Northeast Point	96	17	Northeast Point	485
23	English Bay and Lukanin	521	18	.....do	405
23	Northeast Point	179	18	Zapadni	236
24	Reef and Zoltoi	426	19	Reef and Zoltoi	556
24	Northeast Point	205	19	Northeast Point	445
25	Halfway Point	266	[2]20	English Bay, Middle Hill, Tolstoi, Kitovi, Rocky Point	780
25	Northeast Point	166			
26	Southwest Bay	117			
27	English Bay and Middle Hill	396	20	Northeast Point	556
27	Northeast Point	230	28	Lukanin	129
28	Reef	206	Aug. 5	Reef	123
28	Northeast Point	79	14	Lukanin	124
30	Tolstoi, Middle Hill, English Bay, Kitovi	209	23	Reef	155
			30	.....do	110
30	Northeast Point	98	Sept. 6	Lukanin	83
July 1	Reef	246	13	.....do	93
1	Northeast Point	131	22	.....do	110
2	Halfway Point	242	29	Middle Hill	109
2	Northeast Point	96	Oct. 4	Lukanin	109
3	Southwest Bay	183	14	Middle Hill	114
3	Northeast Point	180	22	.....do	95
4	Tolstoi, English Bay, Middle Hill	494	29	.....do	134
			Nov. 4	Lukanin	515
4	Northeast Point	321	6	Reef	989
5	Reef	526	10	.....do	536
5	Northeast Point	74	12	.....do	824
7	English Bay, Middle Hill, Tolstoi, Lukanin, Kitovi	411	14	Middle Hill	255
			Dec. 4	Reef	283
7	Northeast Point	336			
8	Halfway Point	261		Total	21,920
8	Northeast Point	379			

---

[1] The contrast here visible between 1889 and 1890 is by no means a measure of corresponding decrease in the breeding herd. The fact is that the fictitious quota of 1889 was made up largely of yearlings which belonged properly to the quota of 1891. In like manner the quota of 1889 and the preceding year had largely absorbed the legitimate quota of 1890. It is probable that had the quota been reduced in proportion to the decreasing birth rate, and been confined to the regular ages of animals, the normal quota of 1889 and 1890 would have been between 50,000 and 60,000.

[2] In this year driving for the season was closed on July 20 by order of the Government agent, it being evident that the full quota of 60,000 skins could not be secured, or in fact any considerable number in addition to those taken prior to that date.

ST. GEORGE ISLAND, 1890.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1890.			1890.		
May 13	North	32	July 15	East	132
23	do	37	16	Staraya Artel and North	119
31	Zapadni	109	18	East	71
June 2	North	71	20	Staraya Artel and North	641
16	East	218	20	Zapadni	527
18	North	118	Aug. 1	North	97
19	East and Little East	181	13	do	52
20	Zapadni	394	14	do	42
23	Staraya Artel and North	164	21	do	55
25	East and Little East	184	30	do	63
28	Staraya Artel and North	189	Sept. 9	do	18
30	Zapadni	189	24	do	38
July 1	East and Little East	149	Oct. 16	do	32
3	Staraya Artel and North	238	22	do	42
5	East and Little East	57	30	do	59
7	Zapadni	58	Nov. 5	do	579
8	East and Little East	24	7	do	525
9	Staraya Artel and North	193	Dec. 4	Zapadni	79
11	East	60	4	do	147
12	Staraya Artel and North	103			
14	Zapadni	53		Total	6, 139

ST. PAUL ISLAND, 1891.[1]

1891.			1891.		
May 15	Reef	233	July 15	Lukanin	122
29	do	114	21	Middle Hill	178
June 4	Zapadni	463	27	do	248
11	Zapadni and Reef	718	Aug. 3	Reef	118
11	Northeast Point	1, 112	5	Northeast Point	407
12	Zapadni	428	10	Lukanin	100
13	Northeast Point	430	Nov. 2	Middle Hill	31
13	Middle Hill	232	9	Zoltoi	37
15	Northeast Point	866	14	Middle Hill	142
16	Reef	842	19	do	188
17	Southwest Bay	186	21	Northeast Point	2
18	Reef	1, 027	24	Middle Hill	133
20	Middle Hill	119	25	Reef	102
25	Reef	215	29	do	162
29	do	400	Dec. 5	Northeast Point	3
July 8	do	100			
13	do	121		Total	9, 579

ST. GEORGE ISLAND, 1891.

1891.			1891.		
May 12	North	17	July 24	North	72
22	East	23	25	East, and Little East	181
29	North	85	Aug. 1	North, and Zapadni	26
June 9	North, East, Staraya Artel	442	6	do	15
10	Zapadni	274	13	East	83
15	Staraya Artel	101	17	do	55
17	Zapadni	235	Sept. 24	North	36
19	East	48	Oct. 23	do	104
29	North	25	28	Staraya Artel	25
30	East	153	Nov. 18	East (by marauders)	2
July 1	Staraya Artel	105	23	North	71
3	North	30		For watchmen's food	26
6	East	119			
16	North	54		Total	2, 461
20	East	54			

---

[1] The years 1891–93 cover the period of the modus vivendi during which land killing was limited to the nominal figure of 7,500 seals a year to supply food for the Aleuts. The excess over this figure in 1891 is due to the fact that the skins taken prior to the date of the agreement, June 15, were not included in the limited quota allowed, this being held by the agents to begin on the date of the agreement. As a result of this unnecessary restriction of land killing the rookeries are now grossly overstocked with bulls.

ST. PAUL ISLAND, 1892.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1892.			1892.		
May 19	Reef	83	Aug 9	Specimens	16
24	....do	155	Nov. 11	Reef	111
30	....do	126	12	Tolstoi and Middle Hill	151
June 10	Zoltoi	132	19	Middle Hill	143
18	Reef	119	22	Reef	56
25	Middle Hill and Lukanin	497	22	Zapadni	12
July 1	Reef	469	26	Halfway Point	10
8	Middle Hill	450	28	Zapadni	158
15	Zoltoi	534	Dec. 5	Reef	113
25	Lukanin	274	16	Zapadni and Northeast Point	25
Aug. 1	Lukanin and Zoltoi	403	16	Road skins	5
4	Middle Hill	354			
8	Halfway Point	293			
9	Middle Hill	320		Total	5,009

ST. GEORGE ISLAND, 1892.

1892.			1892.		
May 14	Zapadni	17	Oct. 25	Zapadni	21
20	North	36	26	North, East, and Staraya Artel	30
June 2	.... do	103	28	North	50
8	East	111	Nov. 1	Staraya Artel	15
15	Staraya Artel	149	2	East	53
22	East and Little East	318	3	Zapadni	54
30	Staraya Artel	189	9	North	11
July 7	East	190	11	East	54
14	Staraya Artel and North	310		Food for watchmen for season	30
21	East, North, near, and Staraya Artel	483			
Aug. 2	North	103			
10	North and East	124		Total	2,502
Oct. 20	North, East, and Staraya Artel	51			

ST. PAUL ISLAND, 1893.

1893.			1893.		
May 19	Reef	192	July 21	Lukanin and Zoltoi	1,044
June 1	....do	147	27	English Bay	88
	By watchmen	14	Aug. 2	Gorbatch and Lukanin	252
9	Reef	395	5	Halfway Point	255
16	Tolstoi	471	7	Zoltoi	43
26	Zoltoi	736	Nov. 2	....do	69
26	Northeast Point	1	7	Middle Hill	82
July 6	Reef	489	14	Reef	173
6	Northeast Point	4	22	....do	208
10	Lukanin	171	27	Tolstoi	188
10	Northeast Point and Southwest Bay	3	30	For watchmen to date	67
14	Middle Hill	215		Total	5,500
17	Halfway Point	193			

ST. GEORGE ISLAND, 1893.

1893.			1893.		
May 20	Staraya Artel	49	Oct. 20	North	30
29	North	132	23	Zapadni	77
June 12	.... do	197	27	East and North	47
21	East	278	Nov. 6	North and Staraya Artel	38
26	North and Staraya Artel	555	17	....do	31
July 8	East	90		Food for watchmen	44
15	North	92			
22	Staraya Artel and North	171		Total	1,896
29	East	65			

ST. PAUL ISLAND, 1894.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1894.[1]			1894.		
May 9	Sea Lion (Sivutch) Rock	87	July 23	Northeast Point	370
23	Tolstoi and Reef	104	24	.....do	1,025
31	Gorbatch	141	25	.....do	909
June 14	Reef	1,215	30	Middle Hill	154
19	Tolstoi and Middle Hill	541	Aug. 1	Halfway Point	287
23	Zapadni	850	4	Reef	272
25	Lukanin	558	Nov. 6	Middle Hill	132
July 2	Zoltoi	967	21	Reef	147
4	Northeast Point	869	25	Tolstoi and Reef	87
5	.....do	917	28	.....do	218
6	Halfway Point	522	Dec. 4	Tolstoi, Lukanin, and Reef	474
13	Lukanin	251		For watchmen to date	80
17	Zapadni	944			
21	Reef	1,177		Total	13,298

ST. GEORGE ISLAND, 1894.

1894.			1894.		
May 23	North	40	July 26	Zapadni	178
June 8	.....do	126	Aug. 6	Little East and North	152
22	East	826	Oct. 20	North	58
July 2	Staraya Artel	468	26	East	19
9	Zapadni	303	Nov. 6	North	35
13	East	275		Watchmen's food for season	62
16	Staraya Artel	181			
21	North	249		Total	2,972

ST. PAUL ISLAND, 1895.

1895.[2]			1895.		
May 27	Watchmen, Northeast Point	6	July 27	Lukanin	286
27	Reef	79	Aug. 1	Reef	185
June 1	Watchmen, Northeast Point	3	10	Watchmen to date	18
4	Reef	76	Oct. 31	Watchmen	3
8	Watchmen, Northeast Point	3	Nov. 1	Middle Hill	106
13	Tolstoi	184	9	Watchmen	6
16	Watchmen, Northeast Point	2	12	Tolstoi	158
20	Northeast Point	1,961	19	Watchmen	4
24	Reef	1,548	22	Reef	57
26	Halfway Point	575	25	Middle Hill	96
July 1	English Bay	751	25	Watchmen	4
2	Zapadni	861	26	Reef	78
3	Lukanin	364	Dec. 1	Watchmen	10
9	Northeast Point	960	2	Reef	127
10	.....do	431	5	Tolstoi	81
15	Reef	1,138	6	Reef	169
17	Halfway Point	324	12	Watchmen	9
19	Zapadni	834			
22	Northeast Point	827		Total	12,324

ST. GEORGE ISLAND, 1895.

1895.			1895.		
May 25	Great East	16	Oct. 15	North	7
June 3	North	25	19	Zapadni (by guard)	1
14	.....do	139	21	North	29
24	Staraya Artel	483	23	Zapadni	18
24	Zapadni (by guard)	2	26	Zapadni (by guard)	3
26	Great and Little East	471	29	North	16
29	Zapadni (by guard)	2	Nov. 2	Zapadni (by guard)	3
July 1	North	156	2	East	27
8	Zapadni	232	9	Zapadni (by guard)	2
8	Zapadni (by guard)	3	12	North	8
11	Great and Little East	538	17	Zapadni (by guard)	4
20	Zapadni (by guard)	3	26	North	30
22	Staraya Artel and North	279			
30	Zapadni (by guard)	7		Total	2,522
Aug. 6	.....do	18			

---

[1] The reduced number of drives to be noted in this and the following year was due to the action of the Treasury agents in limiting the number of drives from each rookery to two for the season. This mistaken policy was followed to avoid the supposed injurious effects of driving, a concession which should never have been made. The result was a disadvantage rather than an advantage to the herd.

[2] See note to 1894. Here again the driving was limited to two drives at long intervals in the regular season.

ST. PAUL ISLAND, 1896.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1896.[1]					1896.
May 13	Sea Lion (Sivutch) Rock....	121	July 14	Northeast Point............	1,169
26	Tolstoi......	102	15	Reef and Zoltoi............	849
June 8	Reef..........................	149	16	Tolstoi, Middle Hill, English Bay........................	1,138
19	Zoltoi..........................	283	21	Northeast Point............	808
23	Northeast Point............	1,414	22	.....do	1,047
24	.....do	1,408	23	Polovina......................	585
27	Reef...........................	2,076	25	Lukanin, Kitovi, Zoltoi, Reef..........................	1,630
29	English Bay, Middle Hill, Tolstoi........................	1,398	27	Middle Hill, Tolstoi, Lukanin...........................	621
July 2	Northeast Point............	1,396		For watchmen to date......	14
3	.....do	1,109	Oct. 15	Zoltoi..........................	59
6	Zoltoi and Lukanin....	1,535	Dec. 31	Killed for food to date......	1,545
7	Zapadni......	784			
8	Polovina......................	961			
10	Reef and Zoltoi.............	1,271			
13	Northeast Point............	1,045		Total....	24,517

ST. GEORGE ISLAND, 1896.

1896.			1896.		
May 18	North	15	July 21	East	221
31	.....do	46	24	North and Staraya Artel ...	308
June 11	.....do	100	Oct. 20	.....do	59
19	East	576	21	Zapadni	18
24	Zapadni	568	31	Watchmen	6
26	North and Staraya Artel ...	999	Nov. 2	North and Staraya Artel ...	22
29	East	804	14	Watchmen	15
July 2	Zapadni	333	28	.....do	8
6	North and Staraya Artel ...	700	30	North and Staraya Artel ...	17
7	East and Little East.........	614			
9	Zapadni	221		Total	6,137
13	North and Staraya Artel ...	487			

ST. PAUL ISLAND, 1897.

1897.[2]			1897.		
Mar. 2	Sivutch Rock................	19	July 14	Northeast Point	1,249
17	.....do	29	16	Zapadni	886
May 11	.....do	90	17	Middle Hill, English Bay...	297
22	Tolstoi........................	36	19	Reef, Zoltoi, Lukanin	988
June 15	Reef	492	22	Northeast Point	1,322
18	Zapadni	316	23	Polovina......................	274
23	Zoltoi, Reef, Lukanin	708	24	Reef, Lukanin	526
26	Tolstoi, Middle Hill, English Bay	1,098	26	Zapadni.......................	514
30	Northeast Point	790	27	Tolstoi, Middle Hill..........	199
July 1	.....do	703	29	Northeast Point	268
2	Lukanin........................	208	30	.....do	276
5	Reef, Zoltoi	703	31	Polovina......................	108
6	Tolstoi, Middle Hill, English Bay	1,230	Aug. 2	Reef, Lukanin	418
8	Northeast Point	1,713	5	Middle Hill, English Bay ...	101
9	Polovina................. .	456	7	Reef...........................	172
12	Reef, Lukanin	804		Total to date...........	[3]16,993

---

[1] In this year more normal driving was permitted, but the increased quota is not wholly due to this fact. In the season of 1896 the hauling grounds felt the beneficial effects of the *modus vivendi* of 1893. No pups starved to death in that season and the result was a larger proportion of survivors. A part, also, of the seals which the limited operations of 1895 failed to secure were doubtless taken into the quota of 1896.

[2] The quota of 1897 was left indefinite under the direction of the commission, and the driving was planned with a view to making the quota represent the full product of the hauling grounds. For the same reason the killing was continued into August.

[3] This total, as well as that for St. George Island following, does not include such seals as may have been killed for food in the fall of the year 1897.

ST. GEORGE ISLAND, 1897.

Date.	Rookery.	Total males killed.	Date.	Rookery.	Total males killed.
1897.			1897.		
May 23	North	22	July 10	Watchmen	6
June 1	East	45	13	Staraya Artel and North	253
13	Watchmen	4	16	East	209
16	East	150	19	Zapadni	108
19	Watchmen	4	22	East, North and Staraya Artel	391
24	do	2	31	Watchmen	10
25	Zapadni	140	Aug. 2	East	179
July 1	Watchmen	2	4	North and Staraya Artel	153
3	Staraya Artel	70	10	Watchmen	23
3	Watchmen	4	10	East, North and Staraya Artel	207
7	East	227		Total to date	2, 207

Summary of total killings for all purposes on Pribilof Islands, 1870–1897.[1]

Date.	St. Paul.	St. George.	Total.	Date.	St. Paul.	St. George.	Total.
1870	15, 314	8, 459	23, 773	1884	88, 861	16, 573	105, 434
1871	81, 803	21, 157	102, 960	1885	88, 880	16, 144	105, 024
1872	81, 819	27, 000	108, 819	1886	88, 085	16, 436	104, 521
1873	81, 987	27, 190	109, 177	1887	89, 092	16, 668	105, 760
1874	98, 139	12, 446	110, 585	1888	86, 270	17, 034	103, 304
1875	94, 960	11, 500	106, 460	1889	87, 394	15, 225	102, 619
1876	83, 157	11, 500	94, 657	1890	21, 920	6, 139	28, 059
1877	67, 810	16, 500	84, 310	1891	9, 579	2, 461	12, 040
1878	88, 519	20, 804	109, 323	1892	5, 009	2, 502	7, 511
1879	88, 221	22, 190	110, 411	1893	5, 500	1, 896	7, 396
1880	84, 779	20, 939	105, 718	1894	13, 298	2, 972	16, 270
1881	83, 774	21, 289	105, 063	1895	12, 324	2, 522	14, 846
1882	79, 834	19, 978	99, 812	1896	24, 517	6, 137	30, 654
1883	63, 295	16, 214	79, 509	1897[2]	16, 993	2, 207	19, 200

[1] This table includes all males killed for any purpose on the islands, pups, stagy seals killed for food and seals whose skins were not accepted by the lessees. The totals here given are taken for the year beginning January 1 and ending December 31, and therefore do not correspond to the totals as represented by the quota.

[2] To date of August 7 on St. Paul; of August 10 on St. George.

Record of killings on Northeast Point (St. Paul) and Zapadni (St. George) rookeries, 1871–1897.

NOTE.—These figures are in part taken from the foregoing table of killings. Where this does not distinguish the rookeries concerned, the information is taken from the log of St. Paul Island. The results from these two isolated rookeries are interesting and important in that they show the same relative conditions as are shown by the herd as a whole.

Date.	Total Zapadni.	Total Northeast Point.[1]	Date.	Total Zapadni.	Total Northeast Point.
1871	4, 840	20, 113	1885	3, 873	19, 532
1872	5, 194	26, 082	1886	4, 325	26, 911
1873	7, 507	26, 376	1887	4, 017	29, 602
1874	1, 436	31, 569	1888	4, 063	31, 834
1875	1, 294	35, 193	1889	4, 015	28, 349
1876	599	20, 014	1890	1, 330	[1]6, 592
1877	1, 389	20, 266	1891	509	2, 820
1878	5, 428	22, 961	1892	92	10
1879	4, 866	29, 212	1893	77	6
1880	6, 037	25, 865	1894	481	4, 090
1881	3, 861	18, 294	1895	287	4, 193
1882	....	21, 482	1896	1, 122	9, 396
1883	5, 226	[2]13, 423	1897	293	6, 321
1884	5, 463	23, 068			

[1] The average quota from Northeast Point for twelve years (1871 to 1882) was 24,500. With very much closer killing it only yielded this year about one-fourth this amount.

[2] In this year as well as the year preceding the quota was contracted to about 85,000 for commercial reasons.

Fur seals killed on the island of St. Paul, for all purposes, from 1870 to 1889, both inclusive.

[Compiled from tables on file in the Treasury Department.]

Year.	Seals killed for natives' food.				Seals killed for skins for lessees.			Totals of bachelors killed, accepted, and rejected.			Grand totals of seals killed for all purposes.
	Pups.	Bachelors.	Skins accepted.	Skins rejected.	Bachelors.	Skins accepted.	Skins rejected.	Bachelors.	Skins accepted.	Skins rejected.	
1870	2,800	6,449	....	6,449	6,065	6,017	48	12,514	6,017	6,497	15,314
1871	2,877	2,341	2,290	51	75,585	74,628	957	77,926	76,918	1,008	81,803
1872	5,121	6,916	5,365	1,551	69,782	69,576	206	76,698	74,941	1,757	81,819
1873	5,489	2,090	1,198	892	74,408	73,884	524	76,498	75,082	1,416	81,987
1874	4,897	4,874	4,225	649	88,368	88,258	110	93,242	92,483	759	98,139
1875	3,745	6,282	5,784	498	84,933	84,860	73	91,215	90,644	571	94,960
1876	3,958	5,061	3,064	1,997	74,138	71,137	1	79,199	77,201	1,998	83,157
1877	5,007	4,041	2,853	1,188	58,762	58,732	30	62,803	61,585	1,218	67,810
1878	5,206	4,718	3,632	1,086	78,595	78,570	25	83,313	82,202	1,111	88,519
1879	5,071	5,970	3,898	2,072	77,280	77,280	....	83,250	81,178	2,072	88,321
1880	4,413	4,466	3,408	1,418	75,900	75,872	28	80,366	78,920	1,446	84,779
1881	....	7,538	6,068	1,470	76,236	76,169	67	83,774	82,226	1,537	83,774
1882	....	5,175	3,362	1,813	74,659	74,581	78	79,834	77,943	1,891	79,834
1883	2,982	3,168	2,194	974	57,145	57,070	75	60,313	59,264	1,049	63,295
1884	2,741	3,907	2,582	1,325	82,213	82,086	127	86,120	84,668	1,452	88,861
1885	2,788	3,184	2,508	676	82,908	82,866	42	86,092	85,374	718	88,880
1886	2,824	3,081	2,480	601	82,180	82,150	30	85,261	84,630	631	88,085
1887	2,177	4,207	3,975	232	82,708	82,679	29	86,915	86,654	261	89,092
1888	2,178	3,762	3,700	62	80,330	80,314	16	84,092	84,014	78	86,270
1889	2,280	3,400	2,570	830	81,712	81,698	14	85,112	84,268	844	87,392
Total	67,554	90,630	64,796	25,834	1,463,907	1,461,427	2,480	1,554,537	1,526,212	28,314	1,622,091

NOTE.—The above statement includes all seals killed from all causes, either intentional or accidental, incident to the taking of seal skins on the island of St. Paul.

Fur seals killed on the island of St. George, for all purposes, from 1870 to 1889, both inclusive.

[Compiled from tables on file in the Treasury Department.]

Year.	Seals killed for natives' food.				Seals killed for skins for lessees.			Totals of bachelors killed, accepted, and rejected.			Grand totals of seals killed for all purposes.
	Pups.	Bachelors.	Skins accepted.	Skins rejected.	Bachelors.	Skins accepted.	Skins rejected.	Bachelors.	Skins accepted.	Skins rejected.	
1870	1,200	....	....	....	7,250	7,250	....	7,250	7,250	....	8,450
1871	2,090	237	237	....	18,830	18,830	....	19,067	19,067	....	21,157
1872	2,000	....	....	....	25,000	25,000	....	25,000	25,000	....	27,000
1873	2,190	....	....	....	25,000	25,000	....	25,000	25,000	....	27,190
1874	2,446	....	....	....	10,000	10,000	....	10,000	10,000	....	12,446
1875	1,500	....	....	....	10,000	10,000	....	10,000	10,000	....	11,500
1876	1,500	....	....	....	10,000	10,000	....	10,000	10,000	....	11,500
1877	1,500	256	256	....	14,744	14,744	....	15,000	15,000	....	16,500
1878	1,500	1,532	1,216	316	17,772	17,772	....	19,304	18,988	316	20,804
1879	1,506	843	564	279	19,841	19,758	83	20,684	20,322	362	22,190
1880	1,330	702	565	137	18,907	18,830	77	19,609	19,395	214	20,939
1881	1,031	812	509	303	19,446	19,360	86	20,258	19,869	389	21,289
1882	....	483	371	112	19,495	19,440	55	19,978	19,811	167	19,978
1883	1,000	475	468	7	14,739	14,675	64	15,214	15,143	71	16,214
1884	1,500	345	223	122	14,728	14,620	108	15,073	14,843	230	16,573
1885	1,080	319	304	15	14,745	14,686	59	15,064	14,990	74	16,144
1886	1,286	544	413	131	14,606	14,578	28	15,150	14,991	159	16,436
1887	1,356	585	471	114	14,727	14,725	2	15,312	15,196	116	16,668
1888	978	1,409	1,321	88	14,647	14,582	65	16,056	15,903	153	17,034
1889	1,071	512	280	232	13,642	13,641	1	14,154	13,921	233	15,225
Total	28,064	9,054	7,198	1,856	318,138	317,530	628	327,182	324,608	2,484	355,246

NOTE.—The above statement includes all seals killed from all causes, either intentional or accidental, incident to the taking of seal skins on the island of St. George.

Fur seals killed on the islands of St. Paul and St. George, for all purposes, from 1870 to 1889, both inclusive, being a summary of the two foregoing tables.

	St. Paul Island.	St. George Island.	Total.
Seals killed for natives' food:			
Pups	67, 554	28, 064	95. 628
Bachelors	90, 630	9, 054	99. 684
Skins accepted	64, 796	7, 198	71, 994
Skins rejected *a*	25, 834	1, 856	27, 790
Seals killed for skins for lessees:			
Bachelors	1, 463, 907	318. 128	1, 782, 035
Skins accepted	1, 461, 427	317, 500	1, 778. 927
Skins rejected *a*	2. 480	628	3. 108
Total of bachelors killed, accepted, and rejected:			
Bachelors	1, 554. 537	327, 182	1, 881, 719
Skins accepted	1. 526. 212	324, 698	1, 850, 910
Skins rejected *a*	28, 314	2, 484	30, 798
Grand total of seals killed for all purposes	1, 622, 091	355, 246	1, 977, 337

a We have had occasion to call attention to the waste which these figures show, due to the killing of pups and seals whose skins were unsuitable for use.

Statistics of regular killings for the quota, 1896.

NOTE.—These tables refer only to the drives of the regular killing season. The totals do not include the accumulated food skins of the autumn and spring which became a part of the quota From these figures an idea of the relative degree of exhaustion of the hauling grounds for the two seasons can be obtained.

ST. PAUL ISLAND.

Date.	Rookery.	Animals killed.	Rejected.		Percentage killed.
			Large.	Small.	
1896.					
June 19	Zoltoi	283			
20	Watchmen	2			
23	Northeast Point	1, 414			
24	do	1, 408			
27	Reef	2. 076			
29	English Bay, Middle Hill, Tolstoi	1, 398			
July 2	Northeast Point	1, 396			
3	do	1, 199			
6	Zoltoi, Lukanin	1, 535			
7	Zapadni	784			
8	Polovina	961			
10	Reef, Zoltoi	1, 271			
13	Northeast Point	1, 045	1, 159		
14	do	1, 169			
15	Reef, Zoltoi	849	548	522	44
16	Tolstoi, Middle Hill, English Bay	1, 138	279	1. 038	46
21	Northeast Point	803	811	637	35
22	do	1, 047			
23	Polovina	585	313	344	47
25	Lukanin, Kitovi, Zoltoi, Reef	1, 630	1. 008	1, 177	42
27	Middle Hill, Tolstoi, Lukanin	621	457	137	53
	Total	22, 529			

ST. GEORGE ISLAND.

Date.	Rookery.	Animals killed.	Rejected. Large.	Rejected. Small.	Percentage killed.
1896.					
June 19	East	576			32
24	Zapadni	568			76
26	North and Staraya Artel	999			72
29	East	804			62
July 2	Zapadni	333			68
6	North and Staraya Artel	700			56
7	East and Little East	614			57
9	Zapadni	221	64	265	40
13	North and Staraya Artel	487			46
21	East	221			27
24	North and Staraya Artel	308			17
	Total	5, 836			

RECAPITULATION.

St. Paul Island	22, 529
St. George Island	5. 836
Total	28, 365

Statistics of regular killings for the quota, 1897.

ST. PAUL.

Date.	Rookery.	Animals killed.	Rejected.[1]		Percentage killed.	Weight of skins.[2]
			Large.	Small.		
1897.						*Pounds.*
June 15	Reef	492	144	119	65	
18	Zapadni	316	130	26	67	9
23	Zoltoi, Reef, and Lukanin	708	556	184	48	7.7
26	Tolstoi, Middle Hill, and English Bay	1,098	402	214	64	7.4
30	Northeast Point	790	376	214	57	7
July 1	do	703	288	224	58	
2	Lukanin	208	107	90	53	7.7
5	Reef and Zoltoi	703	229	175	63	7.8
6	Tolstoi, Middle Hill, and English Bay	1,230	301	306	67	7.6
8	Northeast Point	1,713	355	551	65	
9	Polovina	456	97	115	68	7.5
12	Reef and Lukanin	804	140	638	50	
14	Northeast Point	1,249	216	661	58	
16	Zapadni	886	391	586	53	7.8
17	Middle Hill and English Bay	297	180	412	66	8
19	Lukanin, Zoltoi, and Reef	988	377	1,174	39	7
22	Northeast Point	1,322	500	2,047	34	
23	Polovina	274	161	698	24	8.5
24	Lukanin and Reef	526	352	1,380	23	7.4
26	Zapadni	514	491	890	27	8.3
27	Tolstoi and Middle Hill	199	221	545	20	
29	Northeast Point	268	298	1,114	16	
30	do	276	383	708	20	
31	Polovina	108	118	456	16	7.9
Aug. 2	Reef and Lukanin	418	350	1,440	19	8
5	Middle Hill and English Bay	101	159	376	15	7.7
7	Reef	172	200	486	20	7
	Total	16,819				

ST. GEORGE.

1897.						
June 16	East	150	93	159	36	
19 24	Food skins	10				
25	Zapadni	140	74	192	34	
July 1	Food skins	2				
3	Staraya Artel	70	21	330	16	
3	Food skins	4				
7	East	227	41	741	22	
8 10	Food skins	6				
13	North and Staraya Artel	253	54	645	26	7.5
16	East	209	34	690	22	7
17	Food skins	4				
19	Zapadni	104	71	563	13	
22	East, North, and Staraya Artel	391	82	1,650	18	7.3
24 31	Food skins	10				
Aug. 2	East	179	47	902	16	
4	North and Staraya Artel	153	23	725	16	
5 9	Food skins	6				
10	East, North, and Staraya Artel	207	87	1,343	12	
11	Food skins	17				
	Total	2,142				

RECAPITULATION.

St. Paul Island	16,819
St. George Island	2,142
Total	[3]18,961

---

[1] The total number of animals rejected during the season can not be taken as indicating the number of bachelors not of killable age left, as many of them were driven several times and many of the younger seals doubtless do not come to the islands at all during the killing season. The small seals will be taken into the quotas of 1898 and 1899; the large seals go to swell the already overstocked reserve of breeding male life. Until this excess of male life is reduced to normal conditions an effort should be made each year, as was done in 1897, to exhaust the supply of killable seals.

[2] The weight here given is that of 100 skins weighed in lots of 10 each.

[3] This includes all animals killed. The skins of 181 animals were rejected by the lessees.

Statistics regarding land and sea killing, 1871–1897.

Note: A study of this table clearly indicates the decline of the herd since 1884, as measured on its hauling grounds, and shows in the expansion of pelagic sealing the cause of this decline.

Year.	Date quota filled.[a]	Hauling grounds driven.[1]	Number of drives.[a]	Killed on land.[b]	Killed at sea.
1871	July 28	46	43	102,960	16,911
1872	July 25	43	30	108,819	5,336
1873	July 24	51	37	109,177	5,229
1874	July 17	61	41	110,585	5,873
1875	July 16	55	37	106,460	5,033
1876	[c] Aug. 1	36	30	94,657	5,515
1877	July 14	44	32	84,310	5,210
1878	July 18	54	35	109,323	5,544
1879	July 16	71	36	110,411	8,557
1880	July 17	78	38	105,718	8,418
1881	July 20	99	34	105,063	10,382
1882	....do ...	86	36	99,812	15,551
1883	July 19	81	39	79,509	16,557
1884	July 21	101	42	105,434	16,971
1885	July 27	106	63	105,024	23,040
1886	July 26	117	74	104,521	28,494
1887	July 24	101	66	105,760	30,628
1888	July 27	102	73	103,301	26,189
1889	July 31	110	74	102,617	29,858
1890	[d] July 20	87	55	28,059	40,814
1891		(e)	(e)	12,040	59,568
1892		(e)	(e)	7,511	46,642
1893		(e)	(e)	7,396	30,812
1894	Aug. 4			16,270	61,838
1895	July 27			14,846	56,291
1896	....do ...	31	21	[f] 30,654	43,917
1897	Aug. 7	42	27	[f] 19,200	24,321

[a] These figures refer to the hauling grounds of St. Paul.

[b] These totals include all males killed for any purpose on the islands.

[c] In 1876 the killing was begun at an unusual date, said to be on account of an exceptionally late season.

[d] Closed by order of the agent in charge.

[e] Years of the modus vivendi.

[f] These figures as originally published (28,964 and 20,890) in an appendix to the report of the fur-seal conference are slightly in error because of confusion resulting from an effort to eliminate certain food skins taken in the fall of the year preceding.

NOTES ON FOREGOING TABLE.

1. The figures refer to the Pribilof herd.

2. The dates given for the filling of the quota refer only to St. Paul Island. The same is true of the data regarding the number of drives and hauling grounds.

3. The totals for land killing represent all males killed for any purpose—the filling of the quota and the supplying of food for the natives. They therefore include pups and seals whose skins were rejected because stagy or otherwise unsuitable. The figures are taken from the list of daily killings[1] prepared by Colonel Murray, and, in accordance with the method adopted by him, they begin and end with January instead of with August, the date at which the quota is begun and ended.

4. The totals for the pelagic catch are taken from the statistical tables[2] published by the Treasury Department for 1896.

5. The later date at which the quota was filled in 1871–1873 is due to the fact that in these years part of the quota was taken the preceding fall. After 1893 the regular driving for the quota was all done in June and July.

6. From the log of the islands it would appear that the season of 1876 was a peculiar one, the movements of the animals being some two or three weeks behind that of preceding years.

7. The contraction in the killing on land in 1876–77 and 1882–83 was voluntary on the part of the lessees.

8. In 1891-1893 land killing was limited under the modus vivendi. Bering Sea was closed for the same reason in 1892–93, but pelagic sealing went on off the Northwest Coast.

9. The driving for the year 1890 was closed on July 20 by order of the Department.

---

[1] Published to 1890 in Senate Doc. 137, 1895.

[2] Fur-seal catch, season of 1896. Treas. Dept. Doc. 1932, 1897.

Daily counts of cows.[1]

Note. These counts show clearly the gradual development of rookery population during the breeding season. The cows begin to arrive about the 12th of June. The maximum of population is reached about July 15, from which time on there is a gradual decrease of population due to the lengthening absence of the cows on their food excursions.

Date.	Cows present.
Amphitheater of Kitovi.	
June 12	0
13	0
14	2
15	3
16	3
17	4
18	6
19	7
20	8
21	9
22	23
23	37
24	43
25	58
26	76
27	105
28	137
29	168
30	210
July 1	246
2	290
3	362
4	414
5	492
6	518
7	550
8	583
9	[2]587
10	680
11	703
12	....
13	634
14	536
15	703
16	678
17	696
18	466
19	558
20	429
21	328
22	416
23	460
24	463
25	426
26	461
27	406
28	514
29	474
30	427
31	[illegible]
Record of harems.	
June 14	[illegible]
20	[illegible]
30	[illegible]
July 8	[illegible]
Record of harems—Continued.	
July 13	46
25	53
Lukanin rookery.	
June 12	1
13	1
14	3
15	5
16	6
17	11
18	19
19	25
20	37
21	52
22	74
23	103
24	131
25	176
26	207
27	257
28	....
29	....
30	635
July 1	....
2	880
3	939
4	1,088
5	1,197
6	1,264
7	1,371
8	1,531
9	[2]1,541
10	1,680
11	1,755
12	....
13	1,736
15	1,841
14[3]	306
15	327
16	325
17	338
18	228
19	209
20	214
21	215
22	219
23	212
24	196
25	186
26	148
27	157
28	177
29	149
30	127
31	124

---

[1] Weather clear; no storms or wind except one day when rain fell, causing a larger number of cows to take to the water and making it difficult to distinguish those present from the rocks.

[2] Rain.

[3] After July 14 it became impossible on account of the scattering of the cows to continue the count for the entire rookery without too great loss of time, and so a section of [illegible] harems was singled out and the count continued on it.

Comparative census, 1896–97.

Note: These figures represent in detail the final estimates of the Commission as to the number of breeding seals on the rookeries of the Pribilof Islands for the seasons in question.

Rookery.	1896 (revised).		1897.	
	Harems.	Cows.	Harems.	Cows.
ST. PAUL.				
Kitovi	182	6.049	179	5.289
Lagoon	120	2.484	115	2,598
Polovina Cliffs	86	2,496	61	2,200
Zapadni Reef	176	3,862	114	3,041
Lukanin	147	4,880	139	4,100
Tolstoi	467	15.504	393	11,593
Zapadni	543	18,027	458	13,511
Little Zapadni	210	4,584	176	5.192
Gorbatch	302	10,026	308	9,086
Ardiguen	27	896	33	736
Reef	504	16,732	454	13,393
Sivutch	105	3.486	102	3,009
Polovina	153	5,079	143	4,218
Little Polovina	45	1,494	40	1,180
Vostochni	975	32,370	910	26.845
Morjovi	293	9.727	233	6.873
Total	4,335	137,696	3.858	112,864
ST. GEORGE.				
North	200	6,640	196	5,782
Little East	44	1,350	46	1,190
East	135	4,482	128	3.776
Zapadni	143	4,747	133	3,923
Staraya Artel	75	2.490	57	1,681
Total	597	19,709	560	16,352
RECAPITULATION.				
St. Paul	4,335	137,696	3,858	112,864
St. George	597	19,709	560	16,352
Grand total	4,932	157.405	4,418	129.216

Pup statistics, 1896—Summary.

Note: The dead bodies of pups were originally counted in August. **These together with the accessions through starvation** were recounted in October, the earlier counts **being deducted to determine the number starved.** As the period of starvation was not yet completed, a count of those **plainly dying was made, and these are** designated as "starving."

Rookery.	Dead.		Starved.	Starving.
	August.	October.		
ST. PAUL ISLAND.				
Kitovi	109	609	500	42
Lukanin	205	579	374	27
Lagoon	78	316	238	51
Tolstoi	1,895	2,449	554	191
Zapadni	3,095	4,395	1,300	154
Little Zapadni	134	693	559	64
Zapadni Reef	104	327	223	18
Gorbatch	712	1,878	1,166	126
Ardiguen	2	78	76	8
Reef	950	2,786	1,836	300
Sivutch Rock	50	284	234	31
Polovina	635	1,555	920	55
Little Polovina	47	119	72	22
Vostochni	1,808	3,313	1,525	329
Morjovi	485	950	445	109
Total	10,309	20,331	10 022	1,527
[1] Addition of 20 per cent for loss between August and October counts			2,061	
Starving pups to be added as starved			1,527	
Addition for bodies taken for dissection			150	
Total starved			13,760	

---

[1] The estimate of 20 per cent here made for the disappearance of carcasses between August and October is shown by the experiences of 1897 to be an underestimate. Fifty per cent would have been nearer the fact.

Pup statistics, 1896—Summary—Continued.

Rookery.	Dead.		Starved.	Starving.
	August.	October.		
ST. GEORGE ISLAND.				
North	259	145	762	7
Staraya Artel	135	194	253	3
Zapadni	190	527	617	4
East	112	15	457	4
Little east	31	16	151	1
Total	736	897	[1]2,240	19
Starving pups added as starved			19	
Total			2,259	
Grand total for both islands	11,045	21,228	16,019	1,546

[1] The figures herein given for starved pups on the rookeries of St. George are estimates based upon the conditions of St. Paul. The foxes had eaten not only the carcasses of the earlier dead pups on St. George, but also those of the starved pups.

Dead pups before August 10, 1896–1897.

Rookery.	1896.	1897.
ST. PAUL.		
Kitovi	109	202
Lagoon	78	70
Lukanin	205	252
Tolstoi	1,895	[1]592
Zapadni	3,095	[2]689
Little Zapadni	134	([3])
Zapadni Reef	104	70
Gorbatch	712	382
Ardiguen	2	10
Reef	950	642
Sivutch Rock	50	([3])
Polovina	635	([3])
Little Polovina	47	([3])
Vostochni	1,808	([3])
Morjovi	485	([3])
Total	10,309	2,910
ST. GEORGE.		
North	259	244
Little East	31	34
East	112	93
Zapadni	199	112
Staraya Artel	135	75
Total	736	558
Grand total	11,045	

[1] Only the sand flat was counted, on which were 1,495 pups in 1896.

[2] Only the gully known as the "death trap" was counted.

[3] Not counted in 1897.

PELAGIC SEALING CATCHES, 1894-1897.

Note: The detailed catches of the American and Canadian sealing fleets for the period 1894-1897 are here given to illustrate the absence of beneficial effect from the regulations of the Paris Award under which the pelagic sealing industry has been conducted since 1894, and incidentally to show the decline of the herd as manifest in the declining catch. The latter fact taken in connection with the diminishing fleet shows the growing unprofitableness of the pelagic industry.

Fur-seal catch of American vessels for 1894.[1]

[Prepared by A. B. Alexander.]

Vessel.	Northwest coast.	Japan coast.	Copper Island.	Bering Sea.	Total.
Alton		1,185			1,185
Alexander		810			810
Anaconda		397			397
Anna Matilda		785			785
Allie I. Algar		1,395		327	1,722
Bonanza		1,724			1,724
Bowhead		1,407			1,407
C. G. White		936			936
Emma and Louisa		1,166			1,166
Emma	66				66
Eppinger		1,080			1,080
Edward E. Webster		1,650			1,650
Ella Johnson				1,214	1,214
Ethel	5				5
Geo. Peabody		231			231
Geo. R. White[2]	80				80
H. C. Wahlberg		326			326
Henry Dennis	6	855			861
Herman		968	324		1,292
Ida Etta	126			736	862
Jane Gray		1,155		138	1,293
Kate and Anna	15	672			687
Louis D	15	1,600			1,615
Louis Olsen		1,197		84	1,281
Lillie L		594	84		678
Josephine		150			150
Mary H. Thomas[3]					
Mascot[4]		535			535
Mattie T. Dyer		862	290		1,152
Mathew Turner[5]		857			857
Penelope		656			656
Prescott		325	102		427
Retriever		837	661		1,498
Rattler		1,046	109		1,155
Rosie Sparks		420		197	617
St. Paul	36				36
Sophie Sutherland		1,788			1,788
San Diego[6]		600			600
Stella Erland				761	761
Teresa		686		318	1,004
Volunteer	100				100
Willard Ainsworth		893	201		1,094
Winchester		1,606			1,606
Amateur[6]	225				225
Columbia[6]	564			403	967
C. C. Perkins[6]	45				45
Deeahks[6]	400			1,023	1,423
Dart[6]	29				29
Felitz[6]	160				160
James G. Swan[6]	600				600
Puritan[6]	180				180
Total	2,652	31,376	1,771	5,201	41,000

---

[1] Senate Doc. 137, 1895.

[2] This vessel had not yet returned.

[3] Lost; number of skins not known.

[4] Lost; 535 skins taken; none saved.

[5] Lost; skins not saved.

[6] Indians from Neah Bay.

Fur-seal catch of Canadian vessels for 1894.[1]

[From official sources.]

Vessels.	Tons.	Crews.		Catch.					
		White.	Indians.	British Columbia coast.	Japanese coast.	Copper Island.	Bering Sea. Male.	Bering Sea. Female.	Total.
Enterprise	69	22			1,254	314			1,568
Rosie Olsen	39	6	16		1,043		425	431	1,899
Umbrina	99	25			2,588	153	30	30	2,801
Oscar and Hattie	81	24			1,733	176			1,909
Diana	150	19			1,961	433			2,394
Brenda	100	26			2,383	343			2,726
Arietis	86	25			1,197		39	52	1,288
Casco	63	22			1,926				1,926
Dora Siewerd	24	26			2,584				2,584
Walter A. Earle	68	8	20		1,471		155	517	2,143
Fawn	159	6	18		911		310	336	1,557
Agnes Macdonald	107	26			1,707	471			2,178
W. P. Hall	99	24			710				710
Mermaid	73	25			1,603	503			2,106
City of San Diego	46	16			1,304	250			1,554
Mary Taylor	43	19			874	250			1,124
Libbie	93	22			1,010	200			1,210
May Belle	58	14			925	907			1,122
Mary Ellen	63	23			1,909	86	105	352	2,452
Viva	92	26			1,437				1,437
W. P. Sayward	60	20			606	35			641
Penelope	70	20			1,306	296			1,602
Vera	60	19			1,075		80	115	1,270
Carlotta G. Cox	76	24			1,947				1,947
Triumph	98	8	36	1,320			1,163	2,077	4,560
Otto	86	25			1,014	623			1,637
E. B. Marvin	96	23			2,118				2,118
Sapphire	109	8	32	535			1,226	879	2,640
Annie E. Paint	82	26			1,497	531			2,028
Geneva	92	27			1,092	558			1,650
Teresa	63	25			1,102	120			1,222
Sadie Turpel	56	22			1,783	171			1,954
Ocean Belle	83	22			530	274			804
Maud S.	97	24			1,343	86			1,429
Aurora	41	18			693	21	79	138	931
Florence M. Smith	99	27			96	81			177
Beatrice	66	5	22	358			342	818	1,518
Mascot	40	4	16		558		299	246	1,103
Favorite	180	5	37	606			752	488	1,846
Annie C. Moore	13	8	37	300			938	1,009	2,256
Labrador	25	5	14	308			179	381	868
Wanderer	25	2	7	400					400
Pioneer	66	24		418		1,263			1,681
Saucy Lass	38	7	17	170			290	378	838
Borealis	37	6	20	303			90	1,059	1,452
Katharine	82	6	26	269			490	569	1,328
Ainoko	75	5	22	467			1,092	565	2,124
Kate	58	5	20	79			303	564	946
Shelby	16	5	10	34			232	145	411
Venture	48	3	17				417	492	909
Walter L. Rich	76	9	25	691			1,000	749	2,440
Mountain Chief	23	1	13	175					175
Fisher Maid	21		8	92					92
Minnie	46	6	20	488			679	986	2,153
San José	81	5	14	20			256	593	869
Kilmeny	19	2	12				307	327	634
Henrietta	31	5	17	315			427	340	1,082
C. D. Rand	51	7	22	357					357
Beatrice	49	21			1,703				1,703
Canoe catch by Indians				3,989					3,989
Total	3,806	888	518	11,703	48,993	7,437	11,705	14,636	94,474

---

[1] Senate Doc. 137, 1895.

Catch of American vessels engaged in pelagic sealing during the season of 1895.[1]

Vessel.	Japan waters.	Russian waters.	American coast.	Bering Sea.	Total.
J. Eppinger	925			452	1,377
Herman	637			430	1,067
E. E. Webster	766			270	1,036
Alton	316			142	358
Mattie T. Dyer		149			149
Emma and Louisa		269		507	776
Bonanza	926			289	1,215
Bowhead	666		18		684
Winchester	589	102	232		923
Sophia Sutherland	295		14		309
Columbia			369	544	913
James G. Swan			224	1,084	1,308
Stella Erland			165	676	841
Puritan			10		10
Teazer			87		87
August			6		6
Matilda			35		35
C. C. Perkins			34		34
Elsie			209		209
Bering Sea			180	663	843
Deeahks			82	592	674
Emmet Felitz			49		49
Idler			41		41
Jessie			24		24
R. Ecrett			99		99
Kate and Anna			391		391
George W. Prescott				329	329
Allie I. Algar	1,004			193	1,197
Rattler	576			472	1,048
Jane Gray	1,112	185			1,297
Teresa				426	426
W. Ainsworth	1,180	61		440	1,681
M. M. Morrill	591			393	984
Louis Olsen	660			349	1,009
Ida Etta	574	484			1,058
Total	10,817	1,250	2,269	8,251	22,587

---

[1] Report of Secretary of Treasury, 1895, pp. CLXXI-II.

Fur-seal catch of Canadian vessels for 1895.[1]

Vessel.	Tons.	Crew.				Catch.					
		Whites.	Indians.	Boats.	Canoes.	British Columbia coast.	Japan coast.	Vicinity of Copper Island.	Bering Sea.		Total.
									Males.	Females.	
Agnes McDonald	107	28	14	8	7		711		593	669	1,973
Ainoko	75	7	26	2	13	325			479	515	1,319
Amateur	18	2	14		7	65					65
Annie C. Moore	113	8	30	2	15	105			730	812	1,647
Annie F. Paint	82	26		8			1,121	135	191	575	2,022
Arietis	86	22		7			680	426			1,106
Aurora	41	7	22	2	11	108			186	527	821
Beatrice (Shanghai)	66	5	28	1	14	230			608	838	1,676
Beatrice (Vancouver)	49	18		6	2				93	109	202
Borealis	37	21		6			801	110	96	641	1,648
Brenda	100						881				881
C. D. Rand	51	7	16	3	8	143			182	459	784
Carlotta G. Cox	76	26		8			920	22	176	449	1,567
Casco	63	19		6			1,308	351			1,659
City San Diego	46	17		5			370	243			613
Diana	50	19		6			872	292			1,164
Director	87	23		7				71	317	300	688
Dora Sieward	93	7	36	2	18	503			766	813	2,082
E. B. Marvin	96	27		8			949	10	125	251	1,332
Enterprise	69	7	30	2	15	221			947	782	1,950
Favorite	80	5	36	1	18	150			927	720	1,797
Fawn	59	6	28	1	14	248			460	316	1,024

---

[1] Annual Report Department Marine and Fisheries, Canadian Government, 1895.

Fur-seal catch of Canadian vessels for 1895—Continued.

Vessel.	Tons.	Crew.		Boats.	Canoes.	Catch.					Total.
		Whites.	Indians.			British Columbia coast.	Japan coast.	Vicinity of Copper Island.	Bering Sea.		
									Males.	Females.	
Fisher Maid	21	1	12	....	6	100	....	....	....	....	109
Florence M. Smith	99	8	41	2	20	285	....	....	563	594	1,443
Fortuna	97	18	.....	5	.....	....	219	....	....	....	219
Geneva	92	29	.....	9	.....	....	1,137	470	....	....	1,607
Henrietta	31	7	8	2	4	....	....	....	45	156	201
Kate	58	6	21	2	10	181	....	....	279	394	854
Katherine	81	7	21	2	11	159	....	....	288	403	850
Kilmeny	18	3	8	.....	4	15	....	....	....	....	15
Labrador	25	4	11	.....	6	51	....	....	76	183	310
Libbie	92	8	21	2	11	234	....	....	451	1,016	1,701
Mary Ellen	63	10	20	5	10	....	854	......	106	356	1,316
Mary Taylor	43	18	.....	5	.....	369	....	434	....	....	803
Mascot	40	7	16	2	8	....	787	168	126	223	1,304
Maud S	97	9	32	2	10	287	....	....	750	642	1,679
May Belle	58	7	28	2	13	234	....	....	437	676	1,347
Mermaid	73	24	.....	7	.....	....	1,113	753	....	....	1,866
Minnie	46	8	18	3	9	....	....	....	266	393	659
Mountain Chief	23	2	16	.....	6	39	....	....	....	....	39
Ocean Belle	83	23	.....	7	.....	....	1,056	562	....	....	1,618
Oscar and Hattie	82	9	24	3	12	147	....	....	652	515	1,314
Otto	86	8	32	3	14	285	....	30	432	364	1,111
Pachwellis	19	.....	14	.....	7	66	....	....	....	....	66
Penelope	69	5	24	2	12	....	....	....	238	532	770
Pioneer	66	24	.....	7	.....	....	845	790	....	....	1,635
Rosie Olsen	39	.....	.....	.....	.....	....	627	....	....	....	627
Sadie Turpel	56	19	.....	6	.....	....	798	470	....	....	1,268
Sapphire	108	8	37	3	19	192	....	....	827	956	1,975
San Jose	31	5	20	2	10	147	....	....	318	251	716
Saucy Lass	38	6	21	1	10	257	....	....	269	432	958
Shelby	16	10	.....	4	.....	124	....	....	....	....	124
South Bend	21	4	10	1	4	....	....	....	37	111	148
Teresa	63	8	17	2	9	102	....	....	335	532	969
Triumph	98	8	43	3	19	353	....	....	862	995	2,210
Urbrina	99	25	.....	7	.....	....	1,187	562	....	....	1,749
Vera	60	19	.....	6	.....	....	853	15	177	272	1,317
Victoria	63	7	25	2	12	187	....	....	601	566	1,354
Viva	92	23	.....	7	.....	....	601	367	....	....	968
Walter L. Rich	76	9	24	2	12	145	....	....	678	534	1,357
Wanderer	25	2	10	1	5	....	....	....	259	97	356
Indian canoes catch	.....	.....	.....	.....	.....	3,787	....	....	....	....	3,787
Total	3,892	705	854	210	421	9,853	18,687	6,281	15,949	19,969	70,739

Fur-seal catch for 1896.[1]

AMERICAN VESSELS.

Vessel.	Catches.			
	North-west coast.	Japan and Russian coasts.	Bering Sea.	Total.
Alton	99	547	175	821
Bering Sea	228		637	865
Columbia	244		404	648
C. C. Perkins	39			39
Deeahks (Indian)	88		535	623
Elsie		935		935
Falcon			340	340
J. Eppinger	1,361			1,361
Jane Gray		487	257	734
Jas. G. Swan	120		93	213
Jessie	140			140
Kate and Anna	595			595
Louisa D.		531	154	685
M. M. Morrill		639	265	904
Puritan	24			24
Penelope	400			400
Rattler		649	289	938
St. Lawrence		405	450	855
Sitka	32			32
Teaser	117			117
Willard Ainsworth		724	201	926
Indian canoes, etc	227			227
Twenty-one vessels	3,714	4,917	3,800	12,432

[1] Statistical tables, fur-seal catch, Document No. 1932, Treasury Department, 1897.

CANADIAN VESSELS.[1]

Vessel.	Commander seal herd.		Pribilof seal herd.		Total.
	Japan coast.	Russian coast.	North-west coast.	Bering Sea.	
Ada				723	723
Agnes McDonald	545			282	827
Ainoko			428	139	567
Allie J. Algar	659	48		411	1,118
Amateur			109		109
Annie C. Moore			431	1,088	1,519
Annie E. Paint	815			225	1,040
Arietis	1,034			438	1,472
Aurora	360			77	437
Beatrice (Shanghai)			381	532	913
Beatrice (Vancouver)			363	92	455
Borealis	327			305	632
C. D. Rand				569	569
Carlotta G. Cox	1,222			234	1,456
Carrie C. W			169	903	1,072
Casco	808	202			1,010
City of San Diego			213	400	613
Diana	997	95			1,092
Director	1,076				1,076
Dolphin			502	607	1,109
Dora Sieward			377	826	1,203
Doris				662	662
E. B. Marvin	836			251	1,087
Favorite			824	1,049	1,873
Fawn			429	614	1,043
Fisher Maid (wrecked)			63		63
Florence M. Smith	602			271	873
Fortuna	537	171			708
Geneva	499	451			950
Ida Etta	663			370	1,033
Kate			204	318	522
Katharine (foundered, 208 skins lost)	215				215
Kilmeny			100		100
Labrador			91	308	399
Libbie			502	[illegible]	1,[illegible]
Mary Ellen				[illegible]	[illegible]

[1] Thompson Report, 1896, pp. 36-37.

Fur-seal catch for 1896—Continued.

CANADIAN VESSELS—Continued.

Vessel.	Commander seal herd.		Pribilof seal herd.		Total.
	Japan coast.	Russian coast.	North-west coast.	Bering Sea.	
Mary Taylor	383			137	520
Mascot	192			417	609
Maud S				602	602
Mermaid	940			345	1,285
Minnie			486	484	970
Ocean Belle	584			316	900
Oscar and Hattie			353	589	942
Otto	719			501	1,220
Ocean Rover				602	602
Osprey				200	200
Pachwellis			152		152
Penelope			458	894	1,352
Pioneer	893			375	1,268
Sadie Turpel	582			281	863
Sapphire			418	1,002	1,420
San Jose (wrecked, 4 skins lost)			230	605	835
Saucy Lass			471	555	1,026
Selma				185	185
South Bend			70	359	429
Teresa	231			483	714
Triumph	606	20		750	1,376
Umbrina	742	41		298	1,081
Venture			269	442	711
Vera	572			264	836
Victoria			164	901	1,065
Viva (seized)	607			70	677
Walter L. Rich			93	399	492
Zillah May				821	821
Indian canoes			2,353		2,353
Sixty-eight vessels	18,246	1,028	10,703	25,700	55,677

SUMMARY OF CANADIAN VESSELS.

Japan coast	18,246
Russian coast	1,028
Commander seal herd	19,274
Northwest coast	10,703
Bering Sea	25,700
Pribilof seal herd	36,403

RECAPITULATION.

Canadian vessels	55,677
American vessels	12,432
Total	[1]68,109

Pelagic fur-seal catch of American vessels, 1897.

Vessel.	Northwest coast.	Bering Sea.	Russian coast.	Total.
Fisher Bros	3			3
Kate and Anna	326			[2]320
J. Eppinger	323	443		[3]1,085
Louisa D.	284			[3]729
Jas. G. Swan	56			56
Columbia	88			88
Deeahks	30			30
W. Ainsworth	389			389
Bering Sea	55			55
Teaser	10			10
Rattler	193			193
Klare	1	215	614	830
St. Lawrence		199	661	860
Total	1,758	857	1,275	4,648

---

[1] In addition to this total for the year 1896 there was a catch of 2,623 skins made by Japanese vessels on the Asiatic side.

[2] There was a difference of 6 in the catch of this vessel between the statement of the master and inspector at Astoria.

[3] The Eppinger took 319 skins, all females, south of the award area, and the Louisa D. took 445, 47 males and 398 females, in the same waters.

Pelagic fur-seal catch of Canadian vessels, 1897.

Vessel.	Northwest coast.	Bering sea.	Russian coast.	Total.
Pioneer	602	13	263	878
C. D. Rand	302	....	....	302
Mary Ellen	290	....	....	290
Alice J. Algar	640	....	....	640
Arietis	167	897	....	1,064
Amateur	20	....	....	20
Enterprise	38	515	....	553
Beatrice	158	579	....	737
Teresa	53	795	....	848
Victoria	....	776	....	776
Mary Taylor	379	565	....	944
E. B. Marvin	277	973	....	1,250
Fawn	51	440	....	491
Ainoko	407	924	....	1,331
Dora Sieward	85	1,254	....	1,339
Minnie	101	895	....	996
City of San Diego	61	402	....	463
Triumph	209	1,551	....	1,760
Ocean Belle	167	792	....	959
Favorite	....	553	....	553
Otto	193	828	....	1,021
Penelope	119	703	....	822
Sadie Turpel	....	252	647	899
Sapphire	98	....	....	98
Zillah May	164	663	....	827
Annie E. Paint	71	393	834	1,298
Borealis	....	312	314	626
Umbrina	....	190	818	1,008
Mermaid	151	....	972	1,123
Charlotta G. Cox	172	....	1,266	1,438
Vera	....	264	276	540
Director	4	....	1,048	1,052
Casco	14	....	1,050	1,064
Labrador	25	....	....	25
Agnes McDonald	....	....	489	489
Geneva	....	78	726	804
Fisher Maid	27	....	....	27
Mountain Chief	12	....	....	12
Pachwellis	24	....	....	24
Indian canoes	1,018	....	....	1,018
Total	6,100	15,607	8,703	30,409

SUMMARY OF PELAGIC FUR-SEAL CATCH, 1897.

American vessels	4,648
Canadian vessels	30,409
Total	[1] 35,057

---

[1] In addition to this a catch of 3,823 skins was taken by Japanese vessels on the Russian coast.

Pelagic seal catches made from the Alaskan and Asiatic seal herds from 1868 to 1897, being a tabulation from the most trustworthy sources obtainable.

Year.	Northwest coast.					Bering Sea.					Award area.*	Japan coast.				Russian coast.							
	Nationality.	Vessels.	Total catch.	Average per vessel.	Per cent of females.	Nationality.	Vessels.	Total catch.	Average per vessel.	Per cent of females.	Total.	Nationality.	Vessels.	Total catch.	Average per vessel.	Nationality.	Vessels.	Total catch.	Average per vessel.	Asiatic, total catch.	Undetermined, American or Asiatic.	Total, American, Asiatic, and undetermined.	Year.
1868			[2]4,367								4,367											4,367	1688
1869			[2]4,430								4,430											4,430	1869
1870			[2]8,686								8,686											8,686	1870
1871			[2]16,911								16,911											16,911	1871
1872			[2]5,336								5,336											5,336	1872
1873			[2]5,229								5,229											5,229	1873
1874			[2]5,873								5,873											5,873	1874
1875		[1]1	[2]5,033								5,033											5,033	1875
1876		[1]1	[2]5,515								5,515											5,515	1876
1877			[2]5,210								5,210											5,210	1877
1878		[1]1	[2]5,544								5,544											5,544	1878
1879		[1]2	[2]8,557								8,557										[4]310	8,867	1879
1880		[1]16	[2]8,718	544							8,718										[4]1,192	9,910	1880
1881		[1]12	[3]10,382	865							10,382											10,382	1881
1882		[1]15	[3]15,551	1,036							15,551											15,551	1882
1883		[1]13	[3]14,057	1,080				[5]2,500			16,557										[4]28	16,585	1883
1884		[1]11	[3]16,971	1,542							16,971										[4]212	17,183	1884
1885		[1]15	[6]21,840	1,456				[6]1,200			23,040										[4]1,920	24,960	1885
1886		[1]34	[7]13,899	408				[8]14,595			28,494										[9]11,000	39,494	1886
1887		[1]47	[10]9,324	198				[11]21,304			30,628										[9]16,000	46,628	1887
1888		[1]39	[12]8,714	223				[13]17,475			26,189										[4]726	26,915	1888
1889		[1]68	[12]14,361	211				[13]15,497			29,858										[9]13,300	43,158	1889
1890		[1]61	[14]21,838	358				[13]18,976			40,814										[9]11,000	51,814	1890
1891		[1]115	[17]32,118	279				[15]27,450			59,568									[16]8,432		[15]68,000	1891
1892		[1]122	[18]46,042	382				Mod.viv			46,642									[18]26,752		73,394	1892
1893	Am	[21]29	[20]2,199	76				Mod.viv			[20]2,199	Am	[19]31	[21]24,320	784	Am	(†)	[21]604					1893
	Can	[22]35	[22]28,613	817				Mod.viv			[22]28,613	Can	22	[22]29,206	1,327	Can	35	[22]12,013	[22]343				
	Total	64	30,812	481							30,812	Total	53	53,526	1,009	Total	(†)	12,617		66,143		[22]96,955	
1894	Am	22	[24]12,398	563	[31]88	Am	10	[24]5,160	516	[31]69	[26]23,710	Am	35	[26]22,184	633	Am		[24]201					1894
	Can	[27]22	[27]11,703	532		Can	27	[27]26,425	978	[22]55	[27]38,128	Can	35	[27]49,483	1,413	Can	24	[27]7,437	309				
	Total	44	24,101	547		Total	37	31,585	853		61,838	Total	70	71,667	1,023	Total	(†)	7,638		79,305		[30]141,143	
1895	Am	[28]19	[28]2,269	119	[31]74	Am	18	[28]8,251	458	[31]73	[28]10,520	Am	14	[28]11,301	635	Am	6	[28]766	127				1895
	Can	[28]33	[29]9,853	298		Can	41	[29]35,918	876	[32]55	[29]45,771	Can	22	[29]18,687	849	Can	20	[29]6,281	314				
	Total	52	12,122	233		Total	59	44,169	748		56,291	Total	36	29,988	833	Total	26	7,047	271	37,935		[30]92,326	
1896	Am	13	3,714	[33]268	[35]92	Am	13	3,800	317	[35]74	7,514	Am	8	4,645	581	Am	1	272	272	4,717		[37]12,431	1896
	Can	27	10,703	[33]309	[35]40	Can	54	25,700	476	[35]60	36,403	Can	28	17,968	642	Can	11	1,306	119	19,274		55,677	
	Total	40	14,417	296	45	Total	67	29,500	440	62	43,917	Total	36	22,613	628	Total	12	1,578	131	24,191	[34]4,889	[34]72,997	
1897	Am	12	1,758	146		Am	8	857	285		2,615	Am	2			Am			635	1,275		[36]4,878	1897
	Can	32	6,099	190		Can	25	15,607	653		21,706	Can	12			Can			725	8,703		30,409	
												Jap				Jap				3,823		3,823	
	Total	44	7,857			Total	28	16,464			24,321	Total	14			Total				13,801		39,110	

* The sum of the totals of Northwest coast and Bering Sea.

† Unknown.

PELAGIC SEAL CATCHES, 1868 TO 1897.

AUTHORITIES FOR FIGURES USED IN FOREGOING TABLE.

[In quoting from Fur-Seal Arbitration Papers the first edition is always referred to.]

[1] Fur-seal Arbitration. App. to U. S. Case, vol. 1, p. 591.

[2] Catches for years 1868 to 1879, inclusive, is made up of Northwest coast catches (Fur-Seal Arbitration; British Commissioners' Report, p. 207 et seq.); Indian canoe catches (British Commissioners' Report, pp. 207, 208), and skins obtained through the Hudson Bay Company's trading stations (British Commissioners' Report, p. 213).

[3] Catches of pelagic sealers and Indian canoes (British Commissioners' Report, pp. 207, 208), and returns from Hudson Bay Company's posts (British Commissioners' Report, p. 213).

[4] San Francisco custom-house records: Deputy Collector Jerome's letters of February 26 et seq., 1892, on file in Treasury Department.

[5] Catch of schooner *City of San Diego* (British Commissioners' Report, p. 208).

[6] Catches of pelagic sealers in North Pacific and Bering Sea (British Commissioners' Report, p. 209), and returns from Hudson Bay Company's posts (British Commissioners' Report, p. 213).

[7] Catches in North Pacific from all sources (British Commissioners' Report, pp. 210, 213).

[8] Marketed catches from Bering Sea (British Commissioners' Report, p. 210) plus 2,000 skins seized on schooners *Onward*, *Thornton*, *Carolina*, and *San Diego* (H. H. McIntyre's manuscript report to Alaska Commercial Company, a copy of which is in possession of Department).

[9] British commissioner's estimated catch of American vessels in all localities (British Commissioners' Report, p. 212).

[10] North Pacific catches (British Commissioners' Report, pp. 210, 213).

[11] Marketed catches from Bering Sea (British Commissioners' Report, p. 210) plus 8,910 skins seized in Bering Sea and unaccounted for by British commissioners; 11,901 skins were seized that year (United States Counter Case, p. 337), and the British commissioners, on page 210 of their report, account for 2,991 of them.

[12] North Pacific catches (British Commissioners' Report, pp. 211, 213).

[13] Bering Sea catches (British Commissioners' Report, pp. 211, 212).

[14] North Pacific catches (British Commissioners' Report, pp. 211, 213).

[15] This figure, 27,450, is the sum of the figures 22,530 and 4,920, the origin of which will be found under note 16. The British commissioners, on page 18 of their report, give the approximate total catch as 68,000.

[16] In a letter from the British foreign office to the Secretary of State, dated May 17, 1895, the Bering Sea catch of British vessels for 1891 is quoted at 29,146. It has been found by this Department that these figures represent the total catch in Bering Sea—that is, including seals killed off the western side, in Russian waters, as well as off the eastern side, which afterwards became the award area. This is borne out by the fact that it appears by the British case before the tribunal at Paris that 41 vessels were warned out of the American side of Bering Sea between June 29 and August 15, 1891, under the modus vivendi of June 15 of that year. It is certain that many of these vessels crossed over to the Russian side of Bering Sea and continued sealing until the close of the season.

Statistics made by Mr. Alfred Fraser, now in possession of the Treasury Department, show that 8,432 skins were thus taken on the western side of Bering Sea in Russian waters. Of these, 6,616 were taken by British vessels and 1,816 by American vessels. We should, therefore, deduct from the British figures (29,146) the sum of 6,616, leaving 22,530 as the British catch in the award area—that is, the eastern side of Bering Sea—for the year 1891.

It further appears from Mr. Fraser's figures that the American catch in Bering Sea in 1891 was 6,736, of which 1,816 were taken in Russian waters and 4,920 in the award area. Adding to the corrected British catch, 22,530, the catch of the American vessels, 4,920, we have 27,450 as the total catch of British and American vessels in that part of Bering Sea known as the award area for the year 1891.

In the report of the Committee on Ways and Means to accompany H. R. 8909, Fifty-third Congress, third session, Report No. 1849, the catch in Bering Sea for the year 1891 was given as 23,041, on the authority of the Treasury Department. These figures included only the returns of British vessels, as no reliable returns as to American vessels were then in the possession of the Department. The result was reached by deducting from the estimate given by Consul Meyers in his report (United States counter case), 28,605, a number of skins estimated to have been taken off the Russian coast. This estimate was reached by a careful examination of all catches referred to in the affidavits and other papers in the case and counter case of the United States and Great Britain, excluding those which were claimed to have been taken off the Russian coast.

That the British returns (above cited), 29,146, include seals taken on the western side of Bering Sea, from the Russian herd, will appear, as above stated, from the fact of the warning of said vessels, under the modus vivendi, and their subsequent crossing to the Russian coast.

The report of the minister of marine and fisheries of Canada for 1891 credits none of the catch to Russian waters. In 1892, however, said report credits 14,805 skins out of a total of 53,912 from said Asiatic shores. The fact that this large catch was made in 1892 points strongly to similar catches in the year 1891, which are confirmed by the above-mentioned evidence.

[17] Obtained by subtracting the total of 27,450 and 8,432 from 68,000.

[18] See United States counter case, page 408.

[19] Taken from Alfred Fraser's estimates for American sealing fleet in Asiatic waters. Skins entered in United States ports.

[20] The smallness of the number, 2,199, suggests that either many of the vessels after clearing sailed directly for the Japan coast, or else the catches off the Northwest coast were transshipped at Japan ports.

[21] The American catch for 1893 is based upon statistics compiled by A. Fraser and on file in the Treasury Department. The United States consul at Victoria states (Consular Reports No. 161, p. 279) that American schooners in 1893 transshipped at Yokohama and Hakodate between 17,000 and 18,000 skins. This is further confirmed by the report of the Canadian department of marine and fisheries for 1893, page clxviii, which gives the catch of American vessels landed at Hakodate as 18,587.

[22] The figures for the catches of Canadian vessels are taken from the report of the Canadian department of marine and fisheries for 1893, page clxvii.

[23] The London trade sales for 1893 account for the disposition of 109,669 pelagic skins.

[24] Compiled from the reports of collectors at ports of entry on the Pacific Coast. These reports are on file in the Treasury Department.

[25] The figure 23,710 is obtained by taking the 6,836 skins noted under the caption "Locality undetermined" in the letter of the Secretary of the Treasury to Congress dated January 21, 1895 (Fifty-third Congress, third session, Ex. Doc., 243), and dividing them between the Asiatic and American herds in similar proportions as the other skins landed at United States ports in United States sealing vessels during 1894. The result would be: American herd, 6,152; Asiatic, 684. Adding 6,152 to the catch on the Northwest coast (12,398) already given and the Bering Sea catch (5,160) already given, we have the total 23,710.

[26] Made up of skins as per records of collectors of customs on the Pacific coast, which credit 1,500 to Asiatic waters; 684 skins, previously referred to in note 25, and the 20,000 skins which it is estimated were transshipped in Japan (Ex. Doc. 243, Fifty-third Congress, third session. "Notes concerning catch for 1894," p. 4).

[27] Taken from report of Canadian department of marine and fisheries for 1894, page 9.

The figures 26,425 include one American vessel, whose catch was 84 skins.

The figures 49,843 contain the catches of three American vessels, which aggregated 490 skins.

The facts in the two foregoing paragraphs are given in a report of Fisheries Commissioner Costigan to the Governor-General of Canada, under date of January 9, 1895, page 9.

[28] Reports of collectors of customs at American ports of entry on the Pacific Coast.

[29] Official statement sent by United States Consul Roberts, at Victoria, under date of November 15, 1895, and on file in the Treasury Department.

[30] The pelagic catch for 1895 is further increased by a catch of about 10,000 skins taken by vessels clearing from Japanese ports.

[31] From returns of United States inspectors who examined skins landed in United States ports.

[32] From official returns of collector of customs, Victoria, British Columbia. Skins not inspected.

[33] In averages per vessel relating to Northwest coast catch, the canoe catches are not included. British Columbia canoe catch, 2,353, included in Canadian Northwest coast total.

[34] Total catch of American and Canadian vessels for 1896 further increased by a catch of 3,392 skins taken by vessels clearing from Japanese ports, and of 1,497 skins taken by natives in the passes of the Aleutian Islands.

[35] All log entries relating to American pelagic catch sworn to by masters of vessels, but most of them changed as to proportion of females upon examination of catches by inspectors of seal skins.

[36] Proportion of females in all Canadian returns taken from statements by masters of vessels. Catches not officially inspected as to sex.

[37] Data concerning catches of American vessels in all waters for 1896 are based on reports from United States custom-houses, supplemented by information collected by Mr. C. H. Townsend; data concerning catches of British Columbia vessels, furnished by the Canadian collector of customs at Victoria; catches in 1895 of vessels belonging to Japanese ports, furnished by United States consular officers in Japan. Catches of similar vessels in 1896 are from unofficial sources, are incomplete, and less than number actually taken.

[38] Total catch of American vessels is increased by the catch of 224 skins taken by the *Prosper* off the Galapagos Islands and by 319 skins taken by the *Eppinger*, and 445 taken by the *Louisa D*, south of the award area.

Total sealing vessels in award area.

	1893.	1894.	1895.	1896.
American	29	30	32	18
Canadian	35	32	49	59
Total	64	62	81	77

Total sealing vessels in Asiatic waters.

American	*a* 31	35	17	8
Canadian	38	36	25	28
Japanese			10	9
Total	69	71	52	45

a Estimated.

Total sealing vessels in Asiatic and American waters.

American	28	35	35	21
Canadian	56	60	62	66
Japanese			10	9
Total	84	95	107	96

Percentage of females in pelagic catches in 1894, 1895, and 1896.

NORTHWEST COAST.

1894.—American vessels,[1] 88 per cent. British[2] give no figures.
1895.—American vessels, 74 per cent. British give no figures.
1896.—American vessels, 93 per cent. British vessels, 40 per cent.

BERING SEA.

1894.—American vessels, 69 per cent. British vessels, 55 per cent.
1895.—American vessels, 73 per cent. British vessels, 55 per cent.
1896.—American vessels, 75 per cent. British vessels, 61 per cent.

---

[1] Statistics for American vessels were obtained from examination of the skins in the customs house.

[2] Statistics for British vessels were furnished by the captains. The vessels of the two fleets were engaged side by side in the same area and at the same time.

[illegible]

Note.—[illegible]

[illegible]

Note.—[illegible] of Bering Sea.

[illegible]

[illegible]

[illegible]

APPENDIX II.

DOCUMENTS RELATING TO THE FUR-SEAL QUESTION.

AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES AND THE GOVERNMENT OF HER BRITANNIC MAJESTY FOR A MODUS VIVENDI IN RELATION TO THE FUR-SEAL FISHERIES IN BERING SEA.

For the purpose of avoiding irritating differences, and with a view to promote the friendly settlement of the question pending between the two Governments touching their respective rights in Bering Sea, and for the preservation of the seal species, the following agreement is made without prejudice to the rights or claims of either party:

(1) Her Majesty's Government will prohibit, until May next, seal killing in that part of Bering Sea lying eastward of the line of demarcation described in Article No. 1 of the treaty of 1867 between the United States and Russia, and will promptly use its best efforts to insure the observance of this prohibition by British subjects and vessels.

(2) The United States Government will prohibit seal killing for the same period in the same part of Bering Sea and on the shores and islands thereof, the property of the United States, (in excess of 7,500 to be taken on the islands for the subsistence and care of the natives), and will promptly use its best efforts to insure the observance of this prohibition by United States citizens and vessels.

(3) Every vessel or person offending against this prohibition in the said waters of Bering Sea outside of the ordinary territorial limits of the United States may be seized and detained by the naval or other duly commissioned officers of either of the High Contracting Parties, but they shall be handed over as soon as practicable to the authorities of the nation to which they respectively belong, who shall alone have jurisdiction to try the offense and impose the penalties for the same. The witnesses and proof necessary to establish the offense shall also be sent with them.

(4) In order to facilitate such proper inquiries as Her Majesty's Government may desire to make, with a view to the presentation of the case of that Government before arbitrators, and in expectation that an agreement for arbitration may be arrived at, it is agreed that suitable persons designated by Great Britain will be permitted at any time, upon application, to visit or to remain upon the seal islands during the present sealing season for that purpose.

Signed and sealed in duplicate at Washington this 15th day of June, 1891, on behalf of their respective Governments, by William F. Wharton, Acting Secretary of State of the United States, and Sir Julian Pauncefote, G. C. M. G., K. C. B., H. B. M., Envoy Extraordinary and Minister Plenipotentiary.

[SEAL.] WILLIAM F. WHARTON.
[SEAL.] JULIAN PAUNCEFOTE.

TREATY BETWEEN THE UNITED STATES OF AMERICA AND GREAT BRITAIN CONCLUDED FEBRUARY 29, 1892.

The United States of America and Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, being desirous to provide for an amicable settlement of the questions which have arisen between their respective Governments concerning the jurisdictional rights of the United States in the waters of Bering's Sea, and concerning also the preservation of the fur-seal in, or habitually resorting to, the said sea, and the rights of the citizens and subjects of either country as regards the taking the fur-seal in, or habitually resorting to, the said waters, have resolved to submit to arbitration the questions involved, and to the end of concluding a convention for that purpose have appointed as their respective Plenipotentiaries:

The President of the United States of America, James G. Blaine, Secretary of State of the United States; and

Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, Sir Julian Pauncefote, G. C. M. G., K. C. B., Her Majesty's Envoy Extraordinary and Minister Plenipotentiary to the United States;

Who, after having communicated to each other their respective full powers which were found to be in due and proper form, have agreed to and concluded the following articles:

ARTICLE I. The questions which have arisen between the Government of the United States and the Government of Her Britannic Majesty concerning the jurisdictional rights of the United States, in the waters of Bering Sea, and concerning also the preservation of the fur-seal in, or habitually resorting to, the said sea, and the rights of the citizens and subjects of either country as regards the taking of fur-seal in, or habitually resorting to, the said waters, shall be submitted to a tribunal of arbitration, to be composed of seven arbitrators, who shall be appointed in the following manner, that is to say: Two shall be named by the President of the United States, two shall be named by Her Britannic Majesty; His Excellency the President of the French Republic shall be jointly requested by the high contracting parties to name one; His Majesty, the King of Italy, shall be so requested to name one; and His Majesty the King of Sweden and Norway, shall be requested to name one. The seven arbitrators to be so named shall be jurists of distinguished reputation in their respective countries; and the selecting powers shall be requested to choose, if possible, jurists who are acquainted with the English language.

In case of death, absence, or incapacity to serve of any or either of the said arbitrators, or in the event of any or either of the said arbitrators omitting or declining or ceasing to act as such, the President of the United States, or Her Britannic Majesty, or His Excellency the President of the French Republic, or His Majesty the King of Italy, or His Majesty, the King of Sweden and Norway, as the case may be, shall name, or shall be requested to name forthwith another person to act as arbitrator in the place and stead of the arbitrator originally named by such head of a state.

And in the event of a refusal or omission for two months after receipt of the joint request from the High Contracting Parties of his Excellency, the President of the French Republic, or His Majesty, the King of Italy, or His Majesty, the King of Sweden and Norway, to name an arbitrator, either to fill the original appointment or to fill a vacancy as above provided, then in such case the appointment shall be made or the vacancy shall be filled in such manner as the High Contracting Parties shall agree.

ART. II. The arbitrators shall meet at Paris within twenty days after the delivery of the counter cases mentioned in Article IV, and shall proceed impartially and carefully to examine and decide the questions that have been or shall be laid before them as herein provided on the part of the Government of the United States and Her Britannic Majesty, respectively. All questions considered by the tribunal, including the final decision, shall be determined by a majority of all the arbitrators.

Each of the High Contracting Parties shall also name one person to attend the tribunal as its agent to represent it generally in all matters connected with the arbitration.

ART. III. The printed case of each of the two parties, accompanied by the documents, the official correspondence, and other evidence upon which each relies, shall be delivered in duplicate to each of the arbitrators and to the agent of the other party as soon as may be after the appointment of the members of the tribunal, but within a period not exceeding four months from the date of the exchange of the ratifications of this treaty.

ART. IV. Within three months after the delivery on both sides of the printed case, either party may, in like manner deliver in duplicate to each of the said arbitrators, and to the agent of the other party, a counter case, and additional documents, correspondence, and evidence so presented by the other party.

If, however, in consequence of the distance of the place from which the evidence to be presented is to be procured, either party shall, within thirty days after the receipt by its agent of the case of the other party, give notice to the other party that it requires additional time for the delivery of such counter case, documents, correspondence, and evidence, such additional time so indicated, but not exceeding sixty days beyond the three months in this article provided, shall be allowed.

If, in the case submitted to the arbitrators, either party shall have specified or alluded to any report or document in its own exclusive possession, without annexing a copy, such party shall be bound, if the other party thinks proper to apply for it, to furnish that party with a copy thereof; and either party may call upon the other, through the arbitrators, to produce the originals or certified copies of any papers adduced as evidence, giving in each instance notice thereof within thirty days after delivery of the case; and the original or copy so requested shall be delivered as soon as may be, and within a period not exceeding forty days after receipt of notice.

ART. V. It shall be the duty of the agent of each party, within one month after the expiration of the time limited for the delivery of the counter case on both sides to deliver in duplicate to each of the said arbitrators and to the agent of the other party a printed argument showing the points and referring to the evidence upon which his Government relies, and either party may also support the same before the arbitrators by oral argument of counsel; and the arbitrators may, if they desire further elucidation with regard to any point, require a written or printed statement or argument, or oral argument of counsel, upon it; but in such case the other party shall be entitled to reply, either orally or in writing, as the case may be.

ART. VI. In deciding the matters submitted to the arbitrators, it is agreed that the following five points shall be submitted to them, in order that their award shall embrace a distinct decision upon each of said five points, to wit:

1. What exclusive jurisdiction in the sea now known as the Bering Sea, and what exclusive rights in the seal fisheries therein, did Russia assert and exercise prior and up to the time of the cession of Alaska to the United States?

2. How far were these claims of jurisdiction as to the seal fisheries recognized and conceded by Great Britain?

3. Was the body of water now known as the Bering Sea included in the phrase "Pacific Ocean," as used in the treaty of 1825 between Great Britain and Russia; and what rights, if any, in the Bering Sea were held and exclusively exercised by Russia after said treaty?

4. Did all the rights of Russia as to jurisdiction, and as to the seal fisheries in Bering Sea east of the water boundary, in the treaty between the United States and Russia of the 30th March, 1867, pass unimpaired to the United States under that treaty?

5. Has the United States any right, and if so, what right of protection or property in the fur-seals frequenting the islands of the United States in Bering Sea, when such seals are found outside the ordinary 3-mile limit?

ART. VII. If the determination of the foregoing questions as to the exclusive jurisdiction of the United States shall leave the subject in such position that the concurrence of Great Britain is necessary to the establishment of regulations for the proper protection of the fur-seal in, or habitually resorting to, the Bering Sea, the arbitrators shall then determine what concurrent regulations outside the jurisdictional limits of the respective Governments are necessary, and over what waters such regulations should extend, and to aid them in that determination, the report of a Joint Commission to be appointed by the respective Governments shall be laid before them, with such other evidence as either Government may submit.

The High Contracting Parties furthermore agree to co-operate in securing the adhesion of other Powers to such regulations.

ART. VIII. The High Contracting Parties having found themselves unable to agree upon a reference which shall include the question of the liability of each for the injuries alleged to have been sustained by the other, or by its citizens, in connection with the claims presented and urged by it; and being solicitous that this subordinate question should not interrupt or longer delay the submission and determination of the main questions, do agree that either may submit to the arbitrators any questions of fact involved in said claims and ask for a finding thereon, the questions of the liability of either Government upon the facts found to be the subject of further negotiation.

ART. IX. The High Contracting Parties have agreed to appoint two commissioners on the part of each Government to make the joint investigation and report contemplated in the preceding Article VII, and to include the terms of the said agreement in the present convention, to the end that the joint and several reports and recommendations of said commissioners may be in due form submitted to the arbitrators, should the contingency therefor arise, the said agreement is accordingly herein included as follows:

Each Government shall appoint two commissioners to investigate conjointly with the commissioners of the other Governments all the facts having relation to seal life in Bering Sea, and the measures necessary for its proper protection and preservation

The four commissioners shall, so far as they may be able to agree, make a joint report to each of the two Governments, and they shall also report, either jointly or severally, to each Government on any points upon which they may be unable to agree.

These reports shall not be made public until they shall be submitted to the arbitrators, or it shall appear that the contingency of their being used by the arbitrators can not arise.

ART. X. Each Government shall pay the expenses of its members of the joint commission in the investigation referred to in the preceding article.

ART. XI. The decision of the tribunal shall, if possible, be made within three months from the close of the argument on both sides.

It shall be made in writing and dated, and shall be signed by the arbitrators who may assent to it.

The decision shall be in duplicate, one copy thereof shall be delivered to the agent of the United States for his Government, and the other copy shall be delivered to the agent of Great Britain for his Government.

ART. XII. Each Government shall pay its own agents and provide for the proper remuneration of the counsel employed by it, and of the arbitrators appointed by it, and for the expense of preparing and submitting its case to the tribunal. All other expenses connected with the arbitration shall be defrayed by the two Governments in equal moieties.

ART. XIII. The arbitrators shall keep an accurate record of their proceedings, and may appoint and employ the necessary officers to assist them.

ART. XIV. The High Contracting Parties engaged to consider the result of the proceedings of the tribunal of arbitration, as a full, perfect, and final settlement of all the questions referred to the arbitrators.

ART. XV. The present treaty shall be duly ratified by the President of the United States of America, by and with the advice and consent of the Senate thereof, and by Her Britannic Majesty; and the ratification shall be exchanged either at Washington or at London within six months from the date hereof, or earlier if possible.

In faith whereof we, the respective Plenipotentiaries, have signed this treaty and have hereunto affixed our seals.

Done in duplicate at Washington the twenty-ninth day of February, one thousand eight hundred and ninety-two.

[SEAL.] JAMES G. BLAINE.
[SEAL.] JULIAN PAUNCEFOTE.

AWARD OF THE TRIBUNAL OF ARBITRATION CONSTITUTED UNDER THE TREATY CONCLUDED AT WASHINGTON THE 29TH OF FEBRUARY, 1892, BETWEEN THE UNITED STATES OF AMERICA AND HER MAJESTY THE QUEEN OF THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND.

[English version.]

Whereas by a treaty between the United States of America and Great Britain, signed at Washington February 29, 1892, the ratifications of which by the Governments of the two countries were exchanged at London on May 7, 1892, it was, amongst other things, agreed and concluded that the questions which had arisen between the Government of the United States of America and the Government of Her Britannic Majesty, concerning the jurisdictional rights of the United States in the waters of Bering Sea, and concerning also the preservation of the fur seal in or habitually resorting to the said sea, and the rights of the citizens and subjects of either country as regards the taking of fur seals in or habitually resorting to the said waters, should be submitted to a tribunal of arbitration to be composed of seven arbitrators, who should be appointed in the following manner. that is to say: Two should be named by the President of the United States; two should be named by Her Britannic Majesty; His Excellency the President of the French Republic should be jointly requested by the high contracting parties to name one; His Majesty the King of Italy should be so requested to name one; His Majesty the King of Sweden and Norway should be so requested to name one; the seven arbitrators to be so named should be jurists of distinguished reputation in their respective countries, and the selecting powers should be requested to choose, if possible, jurists who are acquainted with the English language;

And whereas it was further agreed by Article II of the said treaty that the arbitrators should meet at Paris within twenty days after the delivery of the counter cases mentioned in Article IV, and should proceed impartially and carefully to examine and decide the questions which had been or should be laid before them as in the said treaty provided on the part of the Governments of the United States and of Her Britannic Majesty, respectively, and that all questions considered by the tribunal, including the final decision, should be determined by a majority of all the arbitrators;

And whereas by Article VI of the said treaty it was further provided as follows:

> In deciding the matters submitted to the said arbitrators, it is agreed that the following five points shall be submitted to them in order that their award shall embrace a distinct decision upon each of said five points, to wit:
>
> 1. What exclusive jurisdiction in the sea now known as Bering Sea, and what exclusive rights in the seal fisheries therein, did Russia assert and exercise prior and up to the time of the cession of Alaska to the United States?
>
> 2. How far were these claims of jurisdiction as to the seal fisheries recognized and conceded by Great Britain?
>
> 3. Was the body of water now known as Bering Sea included in the phrase Pacific Ocean, as used in the treaty of 1825 between Great Britain and Russia; and what rights, if any, in Bering Sea were held and exclusively exercised by Russia after said treaty?
>
> 4. Did not all the rights of Russia, as to jurisdiction and as to the seal fisheries in Bering Sea east of the water boundary, in the treaty between the United States and Russia of the 30th of March, 1867, pass unimpaired to the United States under that treaty?
>
> 5. Has the United States any right, and if so, what right, of protection or property in the fur seals frequenting the islands of the United States in Bering Sea when such seals are found outside the ordinary 3-mile limit?

And whereas by Article VII of the said treaty it was further agreed as follows:

> If the determination of the foregoing questions as to the exclusive jurisdiction of the United States shall leave the subject in such position that the concurrence of Great Britain is necessary to the establishment of regulations for the proper protection and preservation of the fur seal in, or habitually resorting to, Bering Sea, the arbitrators shall then determine what concurrent regulations, outside the jurisdiction limits of the respective Governments, are necessary, and over what waters such regulations should extend;
>
> The high contracting parties furthermore agree to cooperate in securing the adhesion of other powers to such regulations;

And whereas by Article VIII of the said treaty, after reciting that the high contracting parties had found themselves unable to agree upon a reference which should include the question of the liability of each for the injuries alleged to have been sustained by the other, or by its citizens, in connection with the claims presented and urged by it, and that "they were solicitous that this subordinate question should not interrupt or longer delay the submission and determination of the main questions," the high contracting parties agreed that "either of them might submit to the arbitrators any question of fact involved in said claims and ask for a finding thereon, the question of the liability of either Government upon the facts found to be the subject of further negotiation;"

And whereas the President of the United States of America named the Hon. John M. Harlan, Justice of the Supreme Court of the United States, and the Hon. John T. Morgan, Senator of the United States, to be two of the said arbitrators; and Her Britannic Majesty named the Right Hon. Lord Hannen and the Hon. Sir John Thompson, minister of justice and attorney-general for Canada, to be two of the said arbitrators; and His Excellency the President of the French Republic named the Baron de Courcel, senator, ambassador of France, to be one of the said arbitrators; and His Majesty the King of Italy named the Marquis Emilio Visconti Venosta, former minister of foreign affairs and senator of the Kingdom of Italy, to be one of the said arbitrators; and His Hajesty the King of Sweden and Norway named Mr. Gregers Gram, minister of state, to be one of the said arbitrators;

And whereas we, the said arbitrators so named and appointed, having taken upon ourselves the burden of the said arbitration, and having duly met at Paris, proceeded impartially and carefully to examine and decide all the questions submitted to us, the said arbitrators, under the said treaty, or laid before us as provided in the said treaty on the part of the Governments of Her Britannic Majesty and the United States, respectively;

Now we, the said arbitrators, having impartially and carefully examined the said questions, do in like manner by this our award decide and determine the said questions in the manner following; that is to say, we decide and determine as to the five points mentioned in Article VI as to which our award is to embrace a distinct decision upon each of them:

As to the first of the said five points, we, the said Baron de Courcel, Mr. Justice Harlan, Lord Hannen, Sir John Thompson, Marquis Visconti Venosta, and Mr. Gregers Gram, being a majority of the said arbitrators, do decide and determine as follows:

By the ukase of 1821 Russia claimed jurisdiction in the sea now known as Bering Sea to the extent of 100 Italian miles from the coast and islands belonging to her; but, in the course of the negotiations which led to the conclusion of the treaties of 1824 with the United States and of 1825 with Great Britain, Russia admitted that her jurisdiction in the said sea should be restricted to the reach of cannon shot from shore, and it appears that from that time up to the time of the cession of Alaska to the United States Russia never asserted in fact or exercised any exclusive jurisdiction in Bering Sea or any exclusive rights in the seal fisheries therein beyond the ordinary limit of territorial waters.

As to the second of the said five points, we, the said Baron de Courcel, Mr. Justice Harlan, Lord Hannen, Sir John Thompson, Marquis Visconti Venosta, and Mr. Gregers Gram, being a majority of the said arbitrators, do decide and determine that Great Britain did not recognize or concede any claim upon the part of Russia to exclusive jurisdiction as to the seal fisheries in Bering Sea outside of ordinary territorial waters.

As to the third of the said five points, as to so much thereof as requires us to decide whether the body of water now known as Bering Sea was included in the phrase "Pacific Ocean," as used in the treaty of 1825 between Great Britain and Russia, we, the said arbitrators, do unanimously decide and determine that the body of water now known as Bering Sea was included in the phrase "Pacific Ocean" as used in the said treaty.

And as to so much of the said third point as requires us to decide what rights, if any, in Bering Sea were held and exclusively exercised by Russia after the said treaty of 1825, we, the said Baron de Courcel, Mr. Justice Harlan, Lord Hannen, Sir John Thompson, Marquis Visconti Venosta, and Mr. Gregers Gram, being a majority of the said arbitrators, do decide and determine that no exclusive rights of jurisdiction in Bering Sea and no exclusive rights as to the seal fisheries therein were held or exercised by Russia outside of ordinary territorial waters after the treaty of 1825.

As to the fourth of the said five points, we, the said arbitrators, do unanimously decide and determine that all the rights of Russia as to jurisdiction and as to the seal fisheries in Bering Sea east of the water boundary, in the treaty between the United States and Russia of the 30th March, 1867, did pass unimpaired to the United States under the said treaty.

As to the fifth of the said five points, we, the said Baron de Courcel, Lord Hannen, Sir John Thompson, Marquis Visconti Venosta, and Mr. Gregers Gram, being a majority of the said arbitrators, do decide and determine that the United States has not any right of protection or property in the fur seals frequenting the islands of the United States in Bering Sea when such seals are found outside the ordinary 3-mile limit.

And whereas the aforesaid determination of the foregoing questions as to the exclusive jurisdiction of the United States, mentioned in Article VI, leaves the subject in such a position that the concurrence of Great Britain is necessary to the establishment of regulations for the proper protection and preservation of the fur seals in or habitually resorting to Bering Sea, the tribunal having decided by a majority as to each article of the following regulations, we, the said Baron de Courcel, Lord Hannen, Marquis Visconti Venosta, and Mr. Gregers Gram, assenting to the whole of the nine articles of the following regulations, and being a majority of the said arbitrators, do decide and determine in the mode provided by the treaty that the following concurrent regulations outside the jurisdictional limits of the respective Governments are necessary, and that they should extend over the waters hereinafter mentioned; that is to say:

REGULATIONS

ARTICLE 1.

The Governments of the United States and of Great Britain shall forbid their citizens and subjects, respectively, to kill, capture, or pursue at any time and in any manner whatever the animals commonly called fur seals within a zone of 60 miles around the Pribilof Islands, inclusive of the territorial waters.

The miles mentioned in the preceding paragraph are geographical miles, of 60 to a degree of latitude.

ARTICLE 2.

The two Governments shall forbid their citizens and subjects, respectively, to kill, capture, or pursue, in any manner whatever, during the season extending each year from the 1st of May to the 1st of July, both inclusive, the fur seals on the high sea, in the part of the Pacific Ocean, inclusive of Bering Sea, which is situated to the north of the thirty-fifth degree of north latitude and eastward of the one hundred and eightieth degree of longitude from Greenwich, till it strikes the water boundary described in Article I of the treaty of 1867 between the United States and Russia, and following that line up to Bering Straits.

ARTICLE 3.

During the period of time and in the waters in which the fur-seal fishing is allowed, only sailing vessels shall be permitted to carry on or take part in fur-seal fishing operations. They will, however, be at liberty to avail themselves of the use of such canoes or undecked boats, propelled by paddles, oars, or sails as are in common use as fishing boats.

ARTICLE 4.

Each sailing vessel authorized to fish for fur seals must be provided with a special license issued for that purpose by its Government, and shall be required to carry a distinguishing flag, to be prescribed by its Government.

ARTICLE 5.

The masters of the vessels engaged in fur-seal fishing shall enter accurately in their official log book the date and place of each fur-seal fishing operation, and also the number and sex of the seals captured upon each day. These entries shall be communicated by each of the two Governments to the other at the end of each fishing season.

ARTICLE 6.

The use of nets, firearms, and explosives shall be forbidden in the fur-seal fishing. This restriction shall not apply to shotguns when such fishing takes place outside of Bering Sea during the season when it may be lawfully carried on.

ARTICLE 7.

The two Governments shall take measures to control the fitness of the men authorized to engage in fur-seal fishing. These men shall have been proved fit to handle with sufficient skill the weapons by means of which this fishing may be carried on.

ARTICLE 8.

The regulations contained in the preceding articles shall not apply to Indians dwelling on the coasts of the territory of the United States or of Great Britain, and carrying on fur-seal fishing in canoes or undecked boats not transported by paddles, oars, or sails, and manned by not more than five persons each in the way hitherto practiced by the Indians, provided such Indians are not in the employment of other persons, and provided that, when so hunting in canoes or undecked boats, they shall not hunt fur-seals outside of territorial waters under contract for the delivery of the skins to any person.

This exemption shall not be construed to affect the municipal law of either country, nor shall it extend to the waters of Bering Sea or the waters of the Aleutian Passes.

Nothing herein contained is intended to interfere with the employment of Indians as hunters or otherwise in connection with fur-sealing vessels, as heretofore.

ARTICLE 9.

The concurrent regulations hereby determined with a view to the protection and preservation of the fur seals shall remain in force until they have been in whole or in part abolished or modified by common agreement between the Governments of the United States and of Great Britain.

The said concurrent regulations shall be submitted every five years to a new examination, so as to enable both interested Governments to consider whether in the light of past experience there is occasion for any modification thereof.

DECLARATIONS MADE BY THE TRIBUNAL OF ARBITRATION AND REFERRED TO THE GOVERNMENTS OF THE UNITED STATES AND GREAT BRITAIN FOR THEIR CONSIDERATION.

[English version.]

I.

The arbitrators declare that the concurrent regulations, as determined upon by the Tribunal of Arbitration, by virtue of Article VII of the treaty of the 29th of February, 1892, being applicable to the high sea only, should, in their opinion, be supplemented by other regulations applicable within the limits of the sovereignty of each of the two powers interested and to be settled by their common agreement.

II.

In view of the critical condition to which it appears certain that the race of fur seals is now reduced in consequence of circumstances not fully known, the arbitrators think fit to recommend both Governments to come to an understanding in order to prohibit any killing of fur seals, either on land or at sea, for a period of two or three years, or at least one year, subject to such exceptions as the two Governments might think proper to admit of.

Such a measure might be recurred to at occasional intervals, if found beneficial.

III.

The arbitrators declare moreover that, in their opinion, the carrying out of the regulations determined upon by the Tribunal of Arbitration should be assured by a system of stipulations and measures to be enacted by the two powers; and that the tribunal must, in consequence, leave it to the two powers to decide upon the means for giving effect to the regulations determined upon by it.

TERMS OF THE ORIGINAL LEASE OF THE SEAL ISLAND WITH THE ALASKA COMMERCIAL COMPANY.

This indenture in duplicate, made this 3d day of August, A. D. 1870, by and between William A. Richardson, Acting Secretary of the Treasury, in pursuance of an act of Congress approved July 1, 1870, entitled "An act to prevent the extermination of fur-bearing animals in Alaska," and the Alaska Commercial Company, a corporation duly established under the laws of the State of California, acting by John F. Miller, its president and agent, in accordance with a resolution at a meeting of its board of trustees, held January 31, 1870, witnesseth:

That said Secretary hereby leases to the said Alaska Commercial Company, without power of transfer, for the term of twenty years from the 1st day of May, 1870, the right to engage in the business of taking fur seals on the islands of St. George and St. Paul within the territory of Alaska, and to send a vessel or vessels to said islands for the skins of such seals.

And the said Alaska Commercial Company, in consideration of their right under this lease, hereby covenant and agree to pay for each year during said term, and in proportion during any part thereof, the sum of $55,000 into the Treasury of the United States in accordance with the regulations of the Secretary to be made for this purpose under said act, which payment shall be secured by deposit of United States bonds to that amount, and also covenant and agree to pay annually into the Treasury of the United States, under said rules and regulations, an internal-revenue tax or duty of $2 for each seal skin taken and shipped by them in accordance with the provisions of the act aforesaid, and also the sum of 62½ cents for each fur-seal skin taken and shipped, and 55 cents per gallon for each gallon of oil obtained from said seals, for sale in said islands or elsewhere, and sold by said company; and also covenant and agree, in accordance with said rules and regulations, to furnish, free of charge, the inhabitants of the islands of St. Paul and St. George annually during said term 25,000 dried salmon, 60 cords of firewood, and a sufficient quantity of salt and a sufficient quantity of barrels for preserving the necessary supply of meat.

And the said lessees also hereby covenant and agree during the term aforesaid to maintain a school on each island, in accordance with said rules and regulations, and suitable for the education of the natives of said islands, for a period of not less than eight months in each year.

And the said lessees further covenant and agree not to kill upon said island of St. Paul more than 75,000 fur seals, and upon the island of St. George not more than 25,000 fur seals per annum; not to kill any fur seal upon the islands aforesaid in any other month except the months of June, July, September, and October of each year; not to kill said seals at any time by use of firearms or means tending to drive said seals from said islands; not to kill any female seals or seals under 1 year old; not to kill any seal in water adjacent to said islands, or on the beach, cliffs, or rocks, where they haul up from the sea to remain.

And the said lessees further covenant and agree to abide by any restriction or limitation upon the right to kill seals under this lease that the act prescribes or that the Secretary of the Treasury shall judge necessary for the preservation of such seals.

And the said lessees hereby agree that they will not in any way sell, transfer, or assign this lease, and that any transfer, sale, or assignment of the same shall be void and of no effect.

And the said lessees further agree to furnish to the several masters of the vessels employed by them certified copies of this lease, to be presented to the Government revenue officers for the time being in charge of said islands, as the authority of said lessees for the landing and taking of said skins.

And the said lessees further covenant and agree that they or their agents shall not keep, sell, furnish, give, or dispose of any distilled spirituous liquors on either of said islands to any of the natives thereof, such person not being a physician and furnishing the same for use as medicine.

And the said lessees further covenant and agree that this lease is accepted, subject to all needful rules and regulations which shall at any time or times hereafter be made by the Secretary of the Treasury for the collection and payment of the rental herein agreed to be paid by said lessees for the comfort, maintainance, education, and protection of the natives of said islands, and for carrying into effect all the provisions of the act aforesaid, and will abide by and conform to said rules and regulations.

And the said lessees, accepting this lease with a full knowledge of the provisions of the aforesaid act of Congress, further covenant and agree that they will fulfill all the provisions, requirements, and limitations of said act, whether herein specifically set out or not.

In witness whereof the parties aforesaid have hereunto set their hands and seals the day and year above written.

[SEAL.] WILLIAM A. RICHARDSON,
Acting Secretary of the Treasury.
[SEAL.] ALASKA COMMERCIAL COMPANY,
By JOHN F. MILLER, *President.*

Executed in presence of—
J. H. SAVILLE.

COPY OF CONTRACT BETWEEN THE UNITED STATES AND THE NORTH AMERICAN COMMERCIAL COMPANY, UNDER WHICH SAID COMPANY IS GRANTED THE EXCLUSIVE RIGHT OF TAKING FUR SEALS UPON THE PRIBILOF ISLANDS IN ALASKA.

This indenture, made in duplicate this twelfth day of March, 1890, by and between William Windom, Secretary of the Treasury of the United States, in pursuance of chapter 3 of title 23, Revised Statutes, and the North American Commercial Company, a corporation duly established under the laws of the State of California, and acting by I. Liebes, its president, in accordance with a resolution of said corporation adopted at a meeting of its board of directors held January 4, 1890, witnesseth:

That the said Secretary of the Treasury, in consideration of the agreements hereinafter stated, hereby leases to the said North American Commercial Company for a term of twenty years, from the first day of May, 1890, the exclusive right to engage in the business of taking fur seals on the islands of St. George and St. Paul, in the Territory of Alaska, and to send a vessel or vessels to said islands for the skins of such seals.

The said North American Commercial Company, in consideration of the rights secured to it under this lease above stated, on its part covenants and agrees to do the things following, that is to say:

To pay to the Treasurer of the United States each year during the said term of twenty years, as annual rental, the sum of sixty thousand dollars, and in addition thereto agrees to pay the revenue tax, or duty, of two dollars laid upon each fur-seal skin taken and shipped by it from said islands of St. George and St. Paul, and also to pay to said Treasurer the further sum of seven dollars sixty-two and one-half cents apiece for each and every fur-seal skin taken and shipped from said islands, and also to pay the sum of fifty cents per gallon for each gallon of oil sold by it made from seals that may be taken on said islands during the said period of twenty years; and to secure the prompt payment of the sixty thousand dollars rental above referred to, the said company agrees to deposit with the Secretary of the Treasury bonds of the United States to the amount of fifty thousand dollars, face value, to be held as a guarantee for the annual payment of said sixty thousand dollars rental, the interest thereon when due to be collected and paid to the North American Commercial Company, provided the said company is not in default of payment of any part of the said sixty thousand dollars rental.

That it will furnish to the native inhabitants of said islands of St. George and St. Paul annually such quantity or number of dried salmon, and such quantity of salt and such number of salt barrels for preserving their necessary supply of meat as the Secretary of the Treasury shall from time to time determine.

That it will also furnish to the said inhabitants eighty tons of coal annually, and a sufficient number of comfortable dwellings in which said native inhabitants may reside; and will keep said dwellings in proper repair; and will also provide and keep in repair such suitable schoolhouses as may be necessary, and will establish and maintain during eight months of each year proper schools for the education of the children on said islands, the same to be taught by competent teachers, who shall be paid by the company a fair compensation, all to the satisfaction of the Secretary of the Treasury; and will also provide and maintain a suitable house for religious worship; and will also provide a competent physician or physicians, and necessary and proper medicines and medical supplies; and will also provide the necessaries of life for the widows and orphans and aged and infirm inhabitants of said islands who are unable to provide for themselves; all of which foregoing agreements will be done and performed by the said company free of all costs and charges to said native inhabitants of said islands or to the United States.

The annual rental, together with all other payments to the United States provided for in this lease, shall be made and paid on or before the 1st day of April of each and every year during the existence of this lease, beginning with the 1st day of April, 1891.

The said company further agrees to employ the native inhabitants of said islands to perform such labor upon the islands as they are fitted to perform, and to pay therefor a fair and just compensation, such as may be fixed by the Secretary of the Treasury, and also to contribute, as far as is in its power, all reasonable efforts to secure the comfort, health, education, and promote the morals and civilization of said native inhabitants.

The said company also agrees faithfully to obey and abide by all rules and regulations that the Secretary of the Treasury has heretofore or may hereafter establish or make in pursuance of law concerning the taking of seals of said islands, and concerning the comfort, morals, and other interests of said inhabitants, and all matters pertaining to said islands and the taking of seals within the possession of the United States. It also agrees to obey and abide by any restrictions or limitations upon the right to kill seals that the Secretary of the Treasury shall judge necessary, under the law, for the preservation of the seal fisheries of the United States; and it agrees that it will not kill or permit to be killed, so far as it can prevent, in any year a greater number of seals than is authorized by the Secretary of the Treasury.

The said company further agrees that it will not permit any of its agents to keep, sell, give, or dispose of any distilled spirits or spirituous liquors or opium, on either of said islands, or the waters adjacent thereto, to any of the native inhabitants of said islands, such person not being a physician and furnishing the same for use as a medicine.

It is understood and agreed that the number of fur seals to be taken and killed for their skins upon said islands by the North American Commercial Company during the year ending May 1, 1891, shall not exceed 60,000.

The Secretary of the Treasury reserves the right to terminate this lease and all rights of the North American Commercial Company under the same at any time, on full and satisfactory proof that the said company has violated any of the provisions and agreements of this lease, or any of the laws of the United States, or any Treasury regulation respecting the taking of fur seals, or concerning the islands of St. George and St. Paul, or the inhabitants thereof.

In witness whereof the parties have set their hands and seals the day and year above written.

[SEAL.] WILLIAM WINDOM, *Secretary of the Treasury.*

[SEAL.] NORTH AMERICAN COMMERCIAL COMPANY,
By I. LIEBES,
President of the North American Commercial Company.

Attest:
H. B. PARSONS, *Assistant Secretary.*

THE CONFERENCE OF FUR-SEAL EXPERTS.

The Conference of Fur-Seal Experts, representing Great Britain, Canada, and the United States, convened at the city of Washington, November 10, 1897. The following were the delegates: On the part of Great Britain, Prof. D'Arcy Wentworth Thompson; on the part of Canada, Mr. James Melville Macoun; on the part of the United States, Hon. Charles Sumner Hamlin and Dr. David Starr Jordan.

Mr. Hamlin was chosen president of the Conference, and Mr. George A. Clark, secretary of Stanford University, and Mr. Robert N. Venning, of the department of marine and fisheries of Canada, were appointed joint secretaries.

Hon. John W. Foster, special commissioner in charge of the fur-seal matter for the United States, and Sir Louis H. Davies, minister of marine and fisheries for Canada, and Mr. C. F. Frederick Adam, of the British legation, attended the sessions of the Conference.

After due deliberation, on November 16, the Conference agreed to and duly signed the following joint statement of conclusions:

JOINT STATEMENT OF CONCLUSIONS RESPECTING THE FUR-SEAL HERD FREQUENTING THE PRIBILOF ISLANDS IN BERING SEA.

The undersigned, duly empowered delegates, engaged during recent years in the investigation of the condition and habits of the fur-seal herd frequenting the Pribilof

Islands in Bering Sea, viz, on behalf of the United States, Charles Sumner Hamlin and David Starr Jordan; on behalf of Great Britain, D'Arcy Wentworth Thompson; on behalf of Canada, James Melville Macoun, have met in conference under instructions from our respective Governments. Under these instructions we were directed "to arrive, if possible, at correct conclusions respecting the numbers, conditions, and habits of the seals frequenting the Pribilof Islands at the present time as compared with the several seasons previous and subsequent to the Paris award."

As a result of such conference, now completed, we, the above-named Charles Sumner Hamlin, David Starr Jordan, D'Arcy Wentworth Thompson, and James Melville Macoun, find ourselves in accord on the propositions contained in the following joint statement of conclusions respecting the fur-seal herd frequenting the Pribilof Islands, and make this our report:

JOINT STATEMENT.

1. There is adequate evidence that since the year 1884, and down to the date of the inspection of the rookeries in 1897, the fur-seal herd of the Pribilof Islands, as measured on either the hauling grounds or breeding grounds, has declined in numbers at a rate varying from year to year.

2. In the absence for the earlier years of actual counts of the rookeries such as have been made in recent years, the best approximate measure of decline now available is found in these facts:

(*a*) About 100,000 male seals of recognized killable age were obtained from the hauling grounds each year from 1871 to 1889. The table of statistics given in Appendix I shows, on the whole, a progressive increase in the number of hauling grounds driven and in the number of drives made, as well as a retardation of the date at which the quota was attained during a number of years previous to 1889.

(*b*) In the year 1896, 28,964 killable seals were taken after continuing the driving till July 27, and in 1897, 19,189 after continuing the driving till August 11.[1] We have no reason to believe that during the period 1896 and 1897 a very much larger number of males of recognized killable age could have been taken on the hauling grounds.

The reduction between the years 1896 and 1897 in the number of killable seals taken, while an indication of decrease in the breeding herd, can not be taken as an actual measure of such decrease. A number of other factors must be taken into consideration, and the real measure of decrease must be sought in more pertinent statistics drawn from the breeding rookeries themselves.

3. From these data it is plain that the former yield of the hauling grounds of the Pribilof Islands was from three to five times as great as in the years 1896 and 1897, and the same diminution to one-third or one-fifth of the former product may be assumed when we include also the results of hunting at sea.

4. The death rate among the young fur seals, especially among the pups, is very great. While the loss among the pups prior to their departure from the islands has been found in the last two years to approach 20 per cent of the whole number born, and though the rate of subsequent mortality is unknown, we may gather from the

---

[1] The nominal quota of 30,000 for 1896 and of 20,890 for 1897 included food skins taken in the fall of 1895 and 1896. (These figures, 28,964 and 19,189, are slightly in error and should read respectively 28,365 and 18,961.)

number which return each year that from one-half to two thirds have perished before the age of three years—that is to say, the killable age for the males and the breeding age for the females.

5. The chief natural[1] causes of death among pups, so far as known at present, are as follows, the importance of each being variable and more or less uncertain:

(*a*) Ravages of the parasitic worm *Uncinaria*, most destructive on sandy breeding areas and during the period from July 15 to August 20.

(*b*) Trampling by fighting bulls or by moving bulls and cows, a source of loss greatest among young pups.[2]

(*c*) Starvation of pups strayed or separated from their mothers when very young or whose mothers have died from natural causes.

(*d*) The ravages of the great killer (*Orca*), known to be fatal to many of the young and perhaps also to older seals.

At a later period drowning in the storms of winter is believed, but not certainly known, to be a cause of death among the older pups.

6. Counts of certain rookeries, with partial counts and estimates of others, show that the number of breeding females bearing pups on St. Paul and St. George was, in 1896 and 1897, between 160,000 and 130,000, more nearly approaching the higher figure in 1896 and the lower in 1897.[3]

7. On certain rookeries, where pups were counted in both seasons, 16,241 being found in 1896 and 14,318 in 1897, or applying a count adopted by Professor Thompson, 14,743 in the latter year, there is evident a decrease of 9 or 12 per cent within the twelvemonth in question. The count of pups is the most trustworthy measure of numerical variation in the herd. The counts of harems, and especially of cows present, are much inferior in value. The latter counts, however, point in the same direction. The harems on all the rookeries were counted in both seasons. In 1896 there were 4,932; in 1897 there were 4,418, a decrease of 10.41 per cent. The cows actually present on certain rookeries at the height of the season were counted in both seasons. Where 10,198 were found in 1896, 7,307 were found in 1897, a decrease of 28.34 per cent.[4]

8. It is not easy to apply the various counts in the form of a general average to all the rookeries of the islands. We recognize that a notable decrease has been suffered

---

[1] That is to say, not including losses ensuing from the killing of mothers at sea.

The number of dead pups counted on the rookeries between August 8 and 14, in 1896, was 11,045. It is recognized that this number is an underestimate, inasmuch as a greater number must have been overlooked than were counted twice. It is also recognized that the great majority of these pups died from the attacks of the worm *Uncinaria*.

[2] The importance of this source of loss we now find to be much less than was supposed to be the case from the investigations made in 1896. (See Reports for 1896, Jordan, p. 45; Thompson, p. 20; Macoun, MSS.)

[3] For detailed account of the census of 1896, see Jordan, Preliminary Report for 1896, p. 15; Thompson, Report for 1896, p. 19; Macoun, Report, 1896, MSS. For a discussion of suggested corrections to the census of 1896, see Jordan, Final Report, 1897. For details of the census of 1897, see Thompson, Report, 1897; Macoun, Report, 1897; Jordan, Report, 1897. A correction to be made in the census of 1896 arises from the agreed assumption that the total number of breeding females was 1.75 times the number seen in the height of the season. Later observations show that the actual total is at least twice the maximum number ever seen at once on a rookery.

[4] The extreme irregularity of the number of cows present on the rookeries from day to day and the consequent invalidity of any comparison of their number is shown by the counts made on Lukanin and Kitovi rookeries during the season of 1897. See Appendix II.

by the herd during the twelvemonth 1896 to 1897, without attempting, save by setting the above numbers on record, to ascribe to the decrease more precise figures.

9. The methods of driving and killing practiced on the islands, as they have come under our observation during the past two years, call for no criticism or objection. An adequate supply of bulls is present on the rookeries; the number of older bachelors rejected in the drives during the period in question is such as to safeguard in the immediate future a similarly adequate supply; the breeding bulls, females, and pups on the breeding rookeries are not disturbed; there is no evidence or sign of impairment, by driving, of the virility of males; the operations of driving and killing are conducted skillfully and without inhumanity.

10. The pelagic industry is conducted in an orderly manner and in a spirit of acquiescence in the limitations imposed by the law.

11. Pelagic sealing involves the killing of males and females alike, without discrimination and in proportion as the two sexes coexist in the sea. The reduction of males effected on the islands causes an enhanced proportion of females to be found in the pelagic catch; hence this proportion, if it vary from no other cause, varies at least with the catch upon the islands. In 1895 Mr. A. B. Alexander, on behalf of the Government of the United States, found 62.3 per cent of females in the catch of the *Dora Siewerd* in Bering Sea, and in 1896 Mr. Andrew Halkett, on behalf of the Canadian government, found 84.2 in the catch of the same schooner in the same sea. There are, no doubt, instances, especially in the season of migration and on the course of the migrating herds, of catches containing a very different proportion of the two sexes.

12. The large proportion of females in the pelagic catch includes not only adult females that are both nursing and pregnant, but also young seals that are not pregnant, and others that have not yet brought forth young, with such also as have recently lost their young through the various causes of natural mortality.[1]

13. The polygamous habit of the animal, coupled with an equal birth rate of the two sexes, permits a large number of males to be removed with impunity from the herd, while, as with other animals, any similar abstraction of females checks or lessens the herd's increase, or, when carried further, brings about an actual diminution of the herd. It is equally plain that a certain number of females may be killed without involving the actual diminution of the herd, if the number killed do not exceed the annual increment of the breeding herd, taking into consideration the annual losses by death through old age and through incidents at sea.

14. While, whether from a consideration of the birth rate or from an inspection of the visible effects, it is manifest that the take of females in recent years has been so far in excess of the natural increment as to lead to a reduction of the herd in the degree related above, yet the ratio of the pelagic catch of one year to that of the following has fallen off more rapidly than the ratio of the breeding herd of one year to the breeding herd of the next.[2]

---

[1] Statements on which to base an estimate of the relative numbers of these several classes are necessarily incomplete, but the following notes may serve as a partial guide: Townsend, Report, 1895, pp. 46, 47; Alexander, Report, 1895, pp. 142, 143; Macoun, Report, 1897, MSS.; Lucas, Report, 1897, MSS.

[2] The catch of the pelagic fleet, Canadian and American, in 1897 in Bering Sea was 16,657 seals. In the summer of 1896 it was 29,500. The aggregate catch which directly influenced the herd of 1897 was 38,922, a number made up by adding to the summer's catch of 1896 the northwest coast catch in the spring of 1897. Up to the present time, accordingly, the pelagic catch already taken (16,657), and

15. In this greater reduction of the pelagic catch, compared with the gradual decrease of the herd, there is a tendency toward equilibrium, or a stage at which the numbers of the breeding herd would neither increase or decrease. In considering the probable size of the herd in the immediate future, there remains to be estimated the additional factor of decline resulting from reductions in the number of surviving pups caused by the larger pelagic catch of 1894 and 1895.

16. The diminution of the herd is yet far from a stage which involves or threatens the actual extermination of the species, so long as it is protected in its haunts on land. It is not possible during the continuance of the conservative methods at present in force upon the islands, with the further safeguard of the protected zone at sea, that any pelagic killing should accomplish this final end. There is evidence, however, that in its present condition the herd yields an inconsiderable return either to the lessees of the islands or to the owners of the pelagic fleet.

Note: The tables referred to in this joint statement as Appendix I and II are already printed in Appendix I of this report (pp. 211 and 212) and need not be repeated here.

AFFIDAVITS OF DYERS AND DRESSERS OF FUR-SEAL SKINS.

The following affidavits of dyers and dressers of fur-seal skins, submitted to the conference of fur-seal experts, may here be placed on record:

QUEEN STREET, *London, E. C.*

I, Geo. Rice, of the city of London, England, make oath and say that I carry on the business of a dyer and dresser of furs and seal skins in this city; that I have been engaged in the seal-skin trade for over thirty years and have personal and practical experience in the various processes of dressing and dyeing skins; that I employ 500 men in my business; that of the seal skins that have been taken in the waters of the North Pacific Ocean and Bering Sea by sealing vessels I have dressed or dyed the skins of the pelagic catch of 1894, 85,000 skins; 1895, 70,000 skins; 1896, 50,000 skins.

That I personally and through my expert employees have had every opportunity of examining these skins; that a part of them, being those of pups or young seals, are not with certainty distinguishable as to sex, but the greater portion of the skins can be readily determined; that of these latter, embracing the pelagic catches of 1894, 1895, 80 per cent, and of 1896, 70 to 80 per cent, were the skins of females; that of the skins of adult seals in these catches, the skins of males were rarely found. I further say that I make this declaration in the interest of truth and for the information of those who are concerned in making regulations for the preservation of the seal herd, and I make this solemn declaration conscientiously believing the same to be true.

GEO. RICE.

Sworn to at "The Elms," Edmonton, in the county of Middlesex, this 26th day of October, 1897, before me.

ALFRED HODGKINSON,
A Commissioner for Oaths.

I, Edmund Wischhusen, of 138 New North road, Islington, in the county of London, seal dresser and unhairer, solemnly and sincerely declare as follows:

1. I have been engaged in the seal-skin trade for over thirty-five years. I have actually worked on seals for the last forty years, and on the Bering Sea seal ever since they have been brought to market. I have had personal and practical experience in the various processes of dressing and unhairing seal skins during that period. I have been regularly employed as an expert by the largest

---

operating directly against next year's supply, is 57.22 per cent less than the pelagic catch which operated against the supply of 1897 (see, also, Appendix I); or, if we compare merely the summer catches, inasmuch as the possible spring catch of 1898 is an unknown factor, we have a reduction of 43.46 per cent. (Later and more accurate returns show the figures here given for the pelagic catch of 1897 to be slightly in error. The Bering Sea catch should be 16,464 and the complete catch 39,110.)

fur merchants in London to examine the skins as they arrive from the pelagic sealers, at Messrs. C. M. Lampsons & Sons', of 64 Queen street, in the city of London, at the Hudson Bay Company's premises in Lime street, and at Messrs. Culverwell & Brooks's, at St. Mary Axe. These are the only firms to whom seal skins have been sent for sale during the last few years. I inspect them in order to determine the quality and condition of the skins, and it is my business to report to the merchants from time to time the quality of the skins, and the merchants act on my report. From my personal inspection in this way I am able to say that fully 80 per cent of the skins which have arrived from the pelagic sealers during the last three years are the skins of female seals. Of the 135,000, or thereabouts, of the pelagic northwest catch of 1894, fully 120,000 came under my notice and were examined by me; and of the 102,000, or thereabouts, of the like catch of 1895, about 100,000 came under my notice and were examined by me; and of the 70,000 forming the like pelagic catch of 1896, the whole parcel came under my notice and were examined by me.

2. There is absolutely no difficulty whatever in distinguishing the sex of the adult seals, as, apart from all other distinctions (and there are several, as for instance, a difference in the size and shape of the head and also in the color), the distinction in the breast is very marked, those of the females being very large and prominent, and those of the males hardly distinguishable. It requires no expert to distinguish the sex. In most instances the hair round the nipples of the female seals has been worn off by the young pups.

The only reason there is a doubt as to the sex of the remaining 20 per cent of the skins is that about this proportion are the skins of very young animals in which, the breasts and heads not being fully developed, the sex is not so easily distinguishable, but this only applies to young pups and not in any way to adult seals.

There is no difficulty whatever in identifying the Bering Sea seals from those caught on the coast of Japan and round or in the vicinity of the Copper Islands.

And I make this solemn declaration, conscientiously believing the same to be true, and by virtue of the provisions of the statutory declarations act of 1835.

E. WISCHHUSEN.

Declared at No. 138 New North road, in the county of London, on this 26th day of October, 1897, before me.

JOHN VENN, *Notary Public.*

NOTE.—Attached thereto are the official certificates of John Venn, notary public, of the city of London, and William M. Osborne, consul-general of the United States, with their official seals.

I, Walter Edward Martin, of 4 Lambeth Hill, in the city of London, member of the firm of C. W. Martin & Sons, of the same place, fur dyers and dressers, solemnly, sincerely, and truly declare as follows:

I am a British subject. I have been in the business of dyeing and dressing fur-seal skins in London about twenty-five years, and have personally handled many hundreds of thousands of such skins, and I have in consequence a special knowledge of seal skins.

I have at various times made a special examination of the skins of the northwest (pelagic) catch of seals (a very large number of which come through my firm's hands) with a view to ascertaining whether they are the skins of male or female seals, and I say that of the seals caught in the Bering Sea and in the North Pacific Ocean by the pelagic sealers fully 80 per cent of them are female seals, and I believe a still larger proportion. The remaining 20 per cent are mostly skins of young pups in which the sex is not very distinguishable, and a few large bulls, not more than about 3 per cent of the entire parcel.

With regard to adult seals, there is no difficulty whatever in detecting the skins of males and the skins of females. The breasts are very prominent in the female seals, and it requires no expert to detect which is the skin of a male seal and which the skin of a female seal, and very often round the breasts of the females the fur has been worn away. The regulations of the arbitrators, made in August, 1893, at Paris, with regard to pelagic sealing have not tended to in any way diminish the proportion of female seals to males killed by the pelagic sealers, and the large majority of the skins of the pelagic catch still bear traces of the seals having been killed by means of shot.

There can be no doubt whatever that a continuation of the present system of slaughtering such a large proportion of the female seals in the open ocean, with the consequential death of such a large proportion of pups, as is admitted by Prof. D'Arcy Thompson in his recent report to be due to pelagic sealing, and the death of the mothers is fast tending to exterminate the seal from the ocean, and that unless some steps are promptly taken to stop pelagic sealing, which under the present conditions can not be profitable to the sealers, the herd will soon be entirely exterminated and destroyed, and I submit that the only means of preserving the seals from entire extinction is to absolutely put an end to pelagic sealing, which it ought not to be difficult to bring about by mutual agreement, due regard being had to the interests of all parties concerned.

And I make this solemn declaration, conscientiously believing the same to be true, and by virtue of the provisions of the statutory declarations act, 1835.

WALTER MARTIN.

Declared at No. 4 Lambeth Hill, in the city of London, this 16th day of September, 1897, before me.

JOHN D. VENN, *Notary Public.*

NOTE.—Attached thereto are the official certificates of John Venn, notary public, of the city of London, and William M. Osborne, consul-general of the United States, with their official seals.

PROHIBITION OF THE KILLING OF FUR SEALS IN THE WATERS OF THE NORTH PACIFIC OCEAN, AND OF THE IMPORTATION OF FUR-SEAL SKINS TAKEN IN SUCH WATERS.

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, D. C., December 30, 1897.

To Collectors and other Officers of the Customs:

The following act, prohibiting the killing of fur seals in the waters of the North Pacific Ocean, and the regulations made thereunder are published for the information and guidance of all concerned:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That no citizen of the United States, nor person owing duty of obedience to the laws or the treaties of the United States, nor any person belonging to or on board of a vessel of the United States, shall kill, capture, or hunt, at any time or in any manner whatever, any fur seal in the waters of the Pacific Ocean north of the thirty-fifth degree of north latitude and including Bering Sea and the sea of Okhotsk.

SEC. 2. That no citizen of the United States, nor person above described in section one, shall equip, use, or employ, or furnish aid in equipping, using or employing, or furnish supplies to any vessel used or employed, or to be used or employed in carrying on or taking part in said killing, capturing, or hunting of fur seals in said waters, nor shall any vessel of the United States be so used or employed.

SEC. 3. That every person guilty of a violation of the provisions of this Act, or of any regulations made thereunder, shall, for each offense, be fined not less than two hundred dollars or more than two thousand dollars, or imprisoned not more than six months, or both; and every vessel, its tackle, apparel, furniture, and cargo, at any time used or employed in violation of this Act, or of the regulations made thereunder, shall be forfeited to the United States.

SEC. 4. That if any vessel of the United States shall be found within the waters to which this Act applies, having on board fur-seal skins or bodies of seals, or apparatus or implements suitable for killing or taking seals, it shall be presumed that such vessel was used or employed in the killing of said seals, or that said apparatus or implements were used in violation of this Act until the contrary is proved to the satisfaction of the court.

SEC. 5. That any violation of this Act or of the regulations thereunder may be prosecuted either in the district court of Alaska or in any district court of the United States in California, Oregon, or Washington.

SEC. 6. That this Act shall not interfere with the privileges accorded to Indians dwelling on the coast of the United States under section six of the Act of April sixth, eighteen hundred and ninety-four, but the limitations prescribed in said Act shall remain in full force.

SEC. 7. That this Act shall not affect in any way the killing or taking of fur seals upon the Pribilof Islands, or the laws of the United States relating thereto.

SEC. 8. That any officer of the Naval or Revenue-Cutter Service of the United States, and any other officers duly designated by the President, may search any vessel of the United States in port or on the high seas suspected of having violated or of having an intention to violate the provisions of this Act, and may seize such vessel and the offending officers and crew and bring them into the most accessible port of the States and Territory mentioned in section five of this Act for trial.

SEC. 9. That the importation into the United States by any person whatsoever of fur-seal skins taken in the waters mentioned in this Act, whether raw, dressed, dyed, or manufactured, is hereby prohibited, and all such articles imported after this Act shall take effect shall not be permitted to be exported, but shall be seized and destroyed by the proper officers of the United States.

SEC. 10. That the President shall have power to make all necessary regulations to carry this Act into effect.

Approved, December 29, 1897.

REGULATIONS.

1. No fur-seal skins, whether raw, dressed, dyed, or otherwise manufactured, shall be admitted to entry in the United States unless there shall be attached to the invoice a certificate, signed by the United States consul at the place of exportation, that said skins were not taken from seals killed within the waters mentioned in said act, specifying in detail the locality of such taking, whether on land or at sea, and also the person from whom said skins were purchased in their raw and dressed state, the date of such purchase, and the lot number. Consuls shall require satisfactory evidence of the truth of such facts by oath or otherwise before giving any such certificate.

No fur-seal skins, whether raw, dressed, dyed, or otherwise manufactured, shall be admitted to entry as part of a passenger's personal effects unless accompanied by an invoice certified by the consul as herein provided.

All fur-seal skins, whether raw, dressed, dyed, or otherwise manufactured, the invoices of which are not accompanied by the certificate above prescribed, shall be seized by the collector of customs and destroyed as provided for in section 9 of the act of December 29, 1897.

2. Every article manufactured in whole or in part from fur-seal skins, the invoice of which is presented as aforesaid to the consul, shall have legibly stamped thereon the name of the manufacturer and the place of manufacture, and shall be accompanied by a statement in writing, under the oath of said manufacturer, that said skin or skins

used in said article were taken from seals not killed at sea within the waters mentioned in said act, specifying the locality in detail, and also the person from whom said skins were purchased in their raw and dressed state, the date of said purchase, and the lot number.

3. When an application is made to a consul for a certificate under these regulations the invoice and proofs of origin presented by the exporter shall be submitted to the Treasury agent designated for the purpose of investigation, and the consul shall not certify any such invoice until such agent shall have made his report.

4. All articles manufactured in whole or in part from fur-seal skins and imported into the United States shall have the linings thereof so arranged that the pelt of the skin or skins underneath shall be exposed for examination.

5. All fur-seal skins, whether raw, dressed, dyed, or otherwise manufactured in whole or in part, whether imported as merchandise or as part of a passenger's effects, shall be sent to the public stores for careful examination and inspection to prevent evasion of the law.

6. All garments made in whole or in part of seal skins and taken from this country may be reentered on presentation of a certificate of ownership from the collector of customs of the port of departure, which certificate shall have been obtained by the owner of the garment by offering the same to the collector for inspection before leaving this country.

7. Nothing in these regulations shall affect the right of any officer of the customs to inspect and seize any fur-seal skin or garment imported which he may find to have been imported in violation of said act.

L. J. GAGE,
Secretary of the Treasury.

Approved:
WILLIAM MCKINLEY.

APPENDIX III.

ILLUSTRATIONS.

The plates herewith presented are designed to show the fact of decline in the fur-seal herd during the period covered by the operations of the regulations of the Paris Award. The number of examples might be multiplied indefinitely, but it is not necessary to do so.

Plate 1.—This is a view in panorama of a portion of Kitovi rookery on St. Paul Island known as the Amphitheater. The photographs were taken on the 15th of July, 1894, when the season was at its height and the maximum number of breeding seals for the season present.

Plate 2.—This is a view of the same breeding ground taken on the 13th of July, 1897, a date which practically coincides with that in plate 1. The contrast for the two seasons is too obvious to require comment.

Plate 3.—This represents a section of the small breeding ground on Reef Peninsula known as Ardiguen. The date is July 15, 1894. By the aid of a glass six harems, aggregating more than 100 cows, can be distinguished. This plate should be compared with plate 5, to follow.

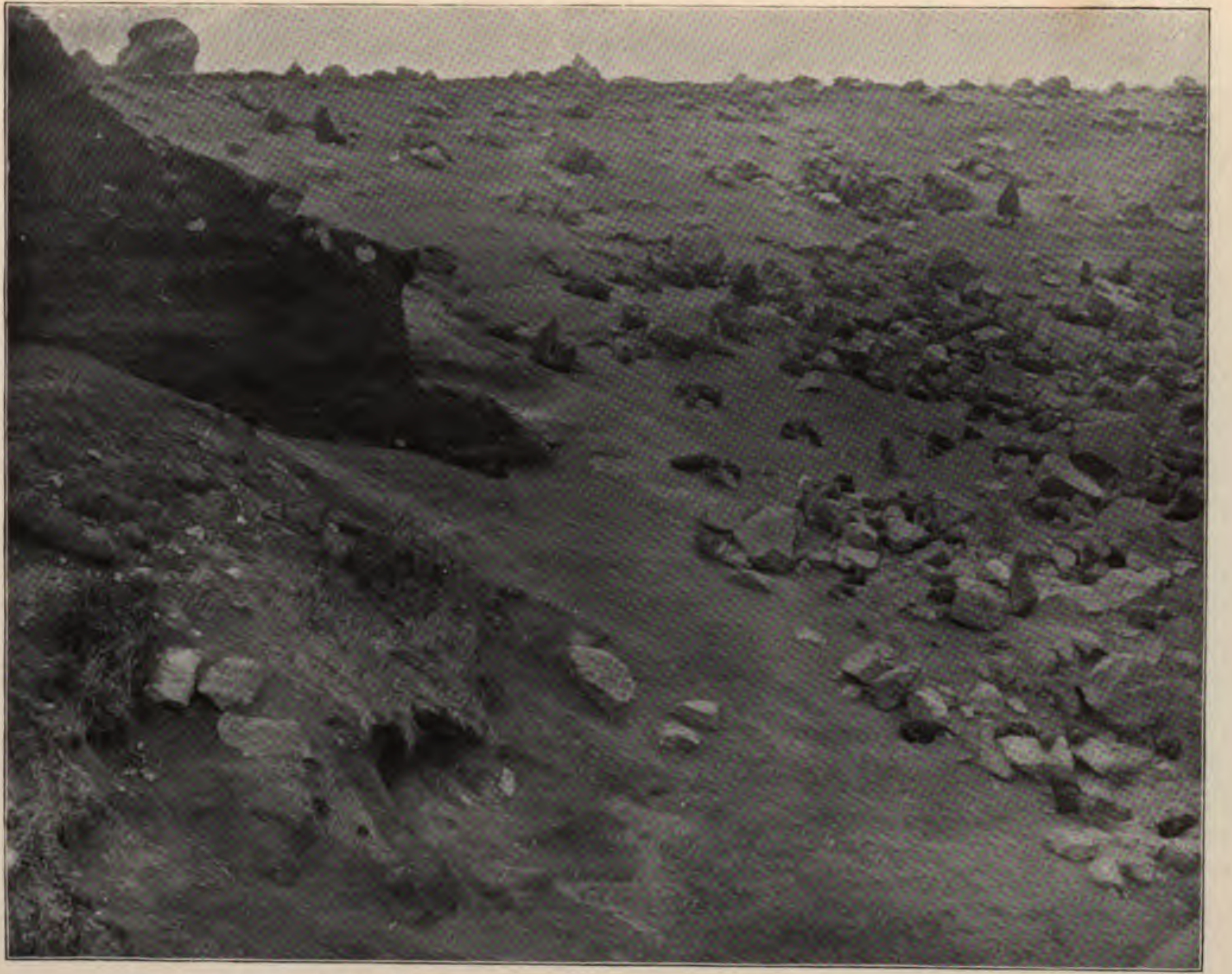
Plate 4.—This view of the same breeding ground for July 20, 1895, is introduced to show the progress of the decline, by comparison with the season of 1894, as shown in plate 3. Ordinarily the shrinkage between successive seasons is not clearly marked in photographs, but the seasons of 1894 and 1895 are exceptional in this regard. The unusual loss which the herd suffered in the first season of the operation of the regulations of the Paris Award—61,000 as against 30,000 in 1893—showed itself distinctly on the breeding grounds in 1894, as indicated in this and other photographs which might be cited.

Plate 5.—This third view of the upper section of Ardiguen for July 13, 1897, when compared with plate 3, shows the most unmistakable evidence of rookery decline, being completely abandoned. In 1896 there were three harems in this territory. The seals represented an overflow due to the crowded condition of the beach, with which it is connected by a narrow ravine. In 1897 there was room for all the seals below.

Plate 6.—This plate shows a bird's-eye view of Zapadni rookery of St. George, taken on July 19, 1895. With it should be contrasted the view of the same rookery in plate 7.

Plate 7.—This view of Zapadni rookery was taken on July 11, 1897. It shows the group in the foreground of plate 6 entirely gone. The large group at the foot of the slope has shrunk perceptibly, as has also the one at some distance beyond. The farthest group shown in 1895 is practically broken up in 1897.

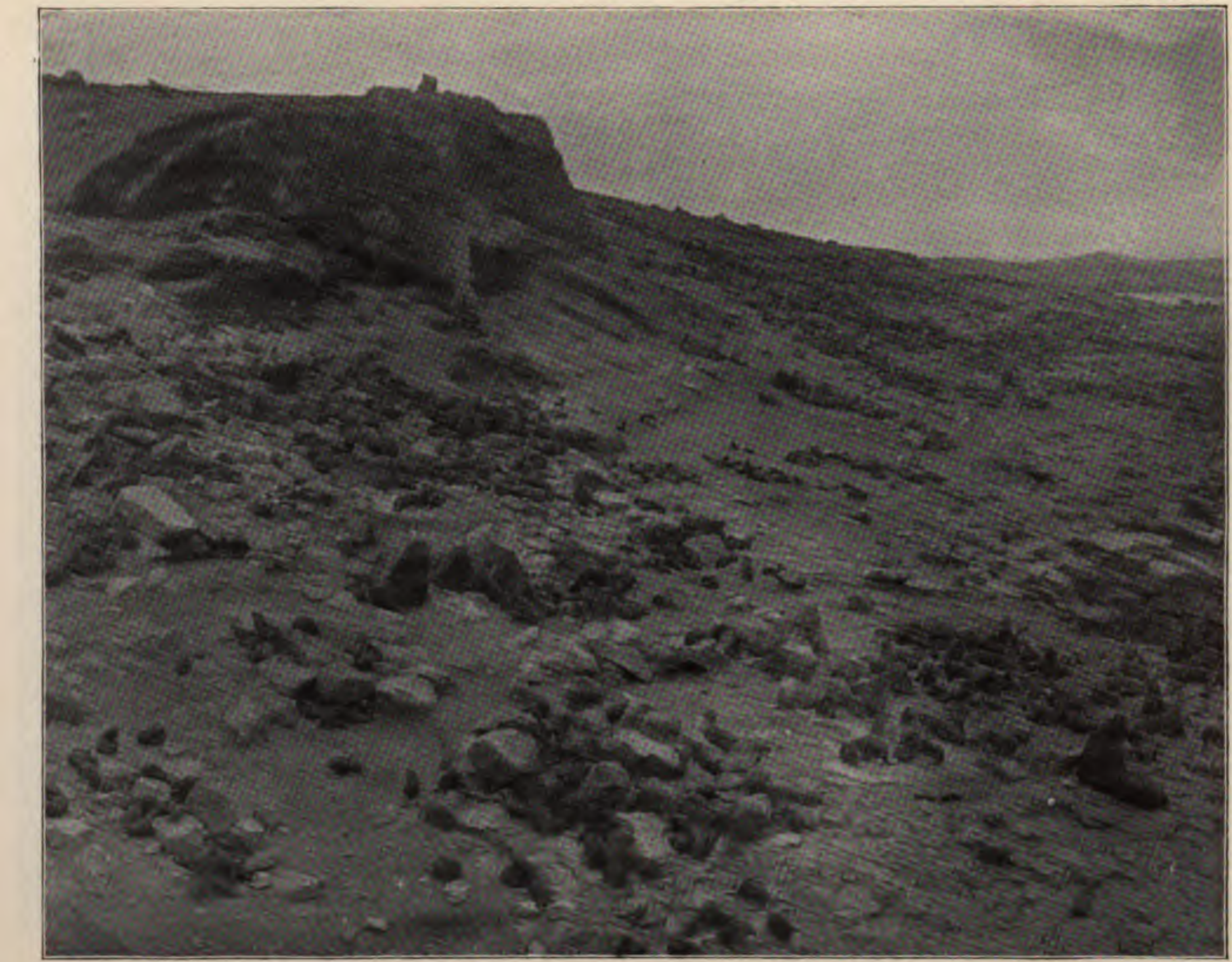
PLATE I *a*.



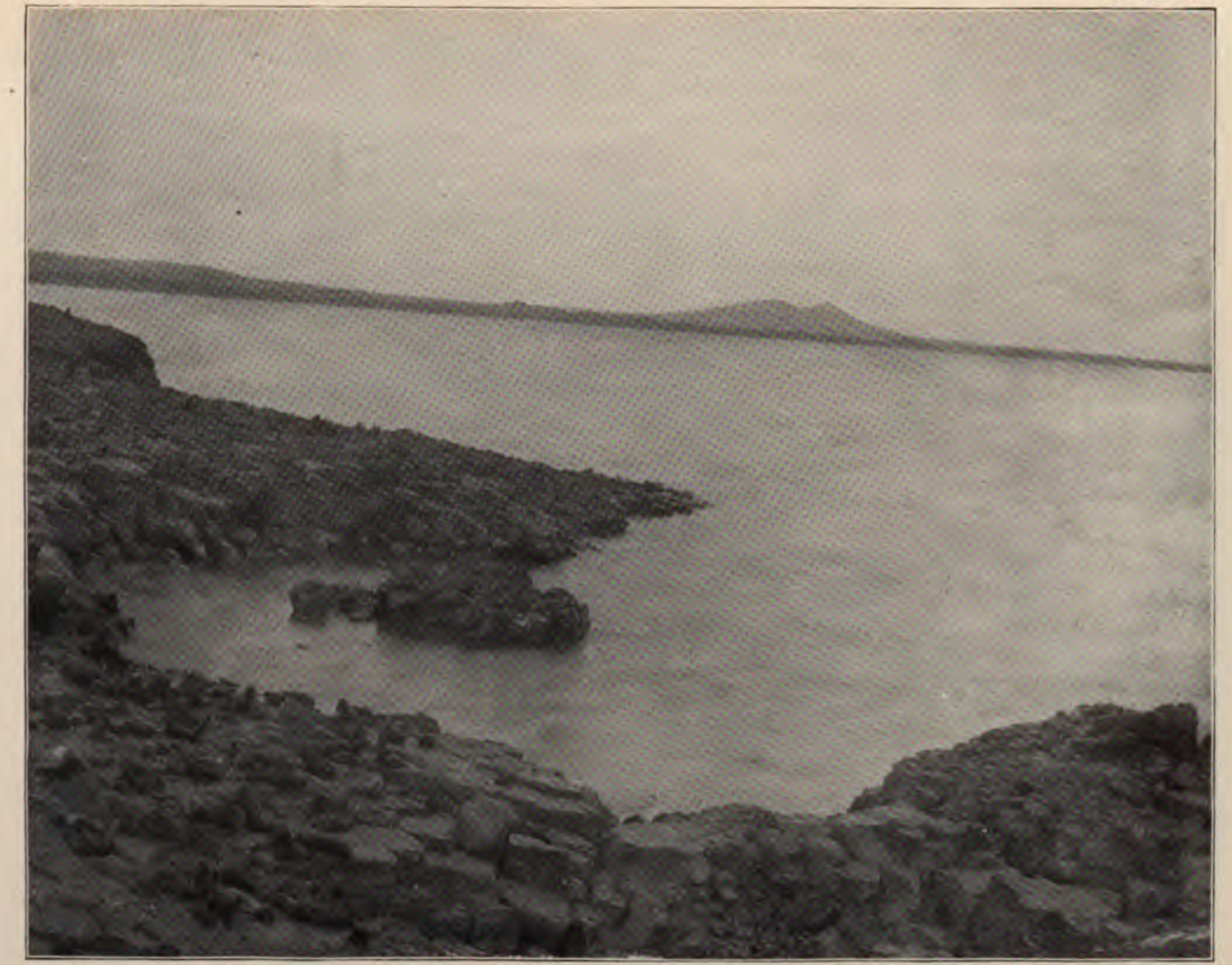
A VIEW OF THE AMPHITHEATER OF KITOVI ROOKERY, SAINT PAUL ISLAND, JULY 15, 1894. (TO BE COMPARED WITH PLATE II.)

Photograph by Townsend.

PLATE I *b*.

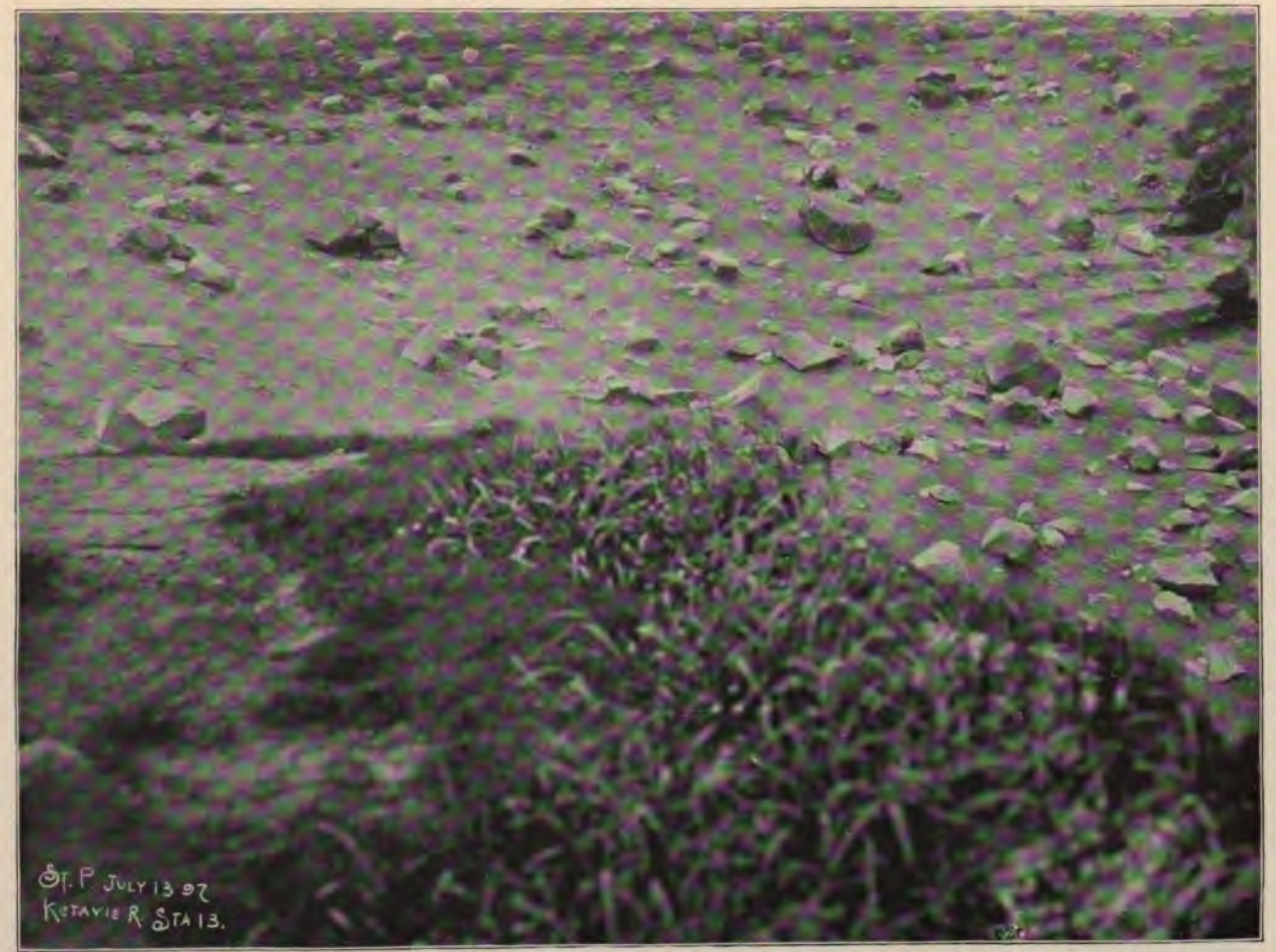


A VIEW OF THE AMPHITHEATER OF KITOVI ROOKERY, SAINT PAUL ISLAND, JULY 15, 1894. (TO BE COMPARED WITH PLATE II.)
Photograph by Townsend.



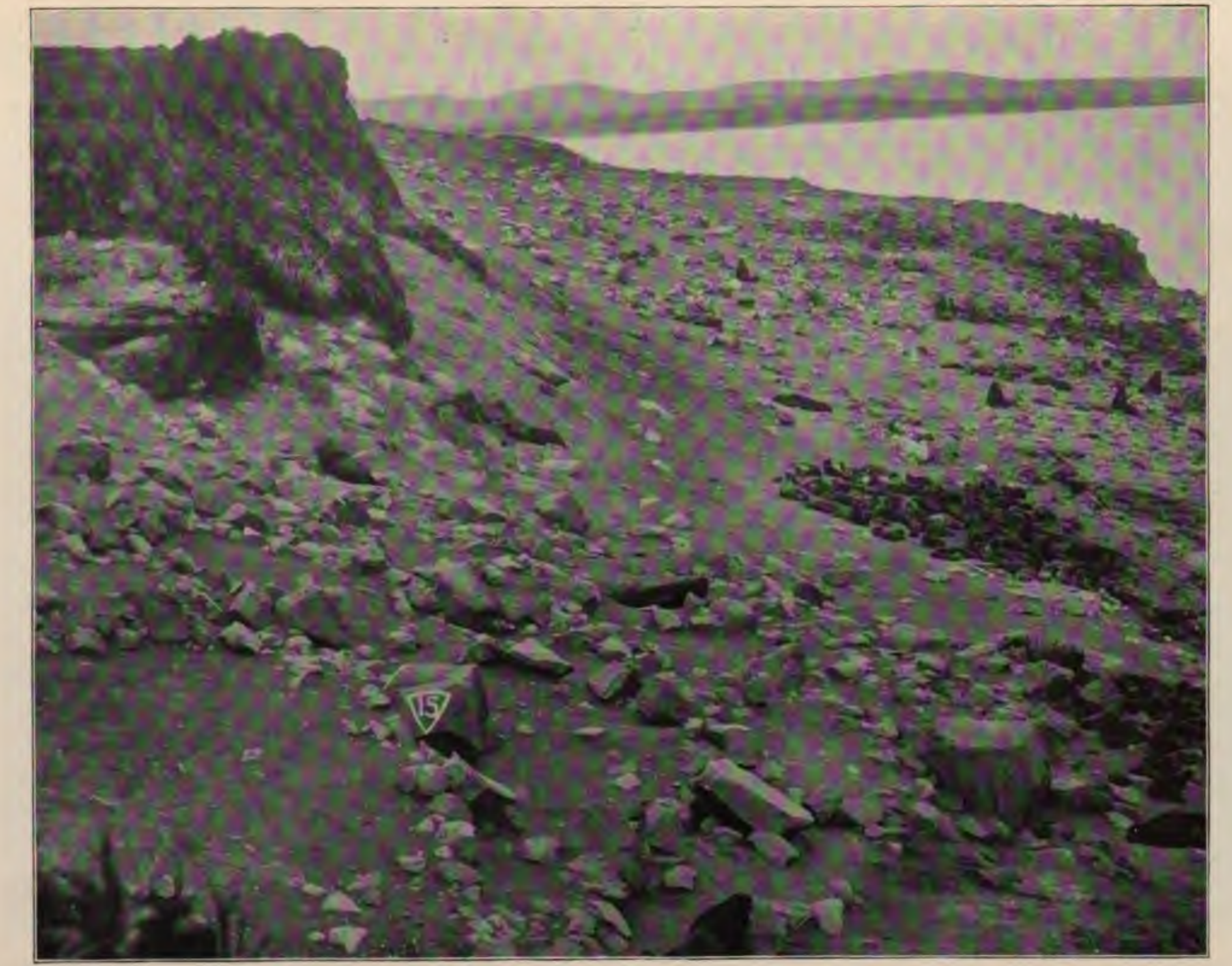
A VIEW OF THE AMPHITHEATER OF KITOVI ROOKERY, SAINT PAUL ISLAND, JULY 15, 1894. (TO BE COMPARED WITH PLATE II.)
Photograph by Townsend.

PLATE II *a*.



A VIEW OF THE AMPHITHEATER OF KITOVI ROOKERY, SAINT PAUL ISLAND, JULY 13, 1897. (TO BE COMPARED WITH PLATE I.)
Photograph by Chichester.

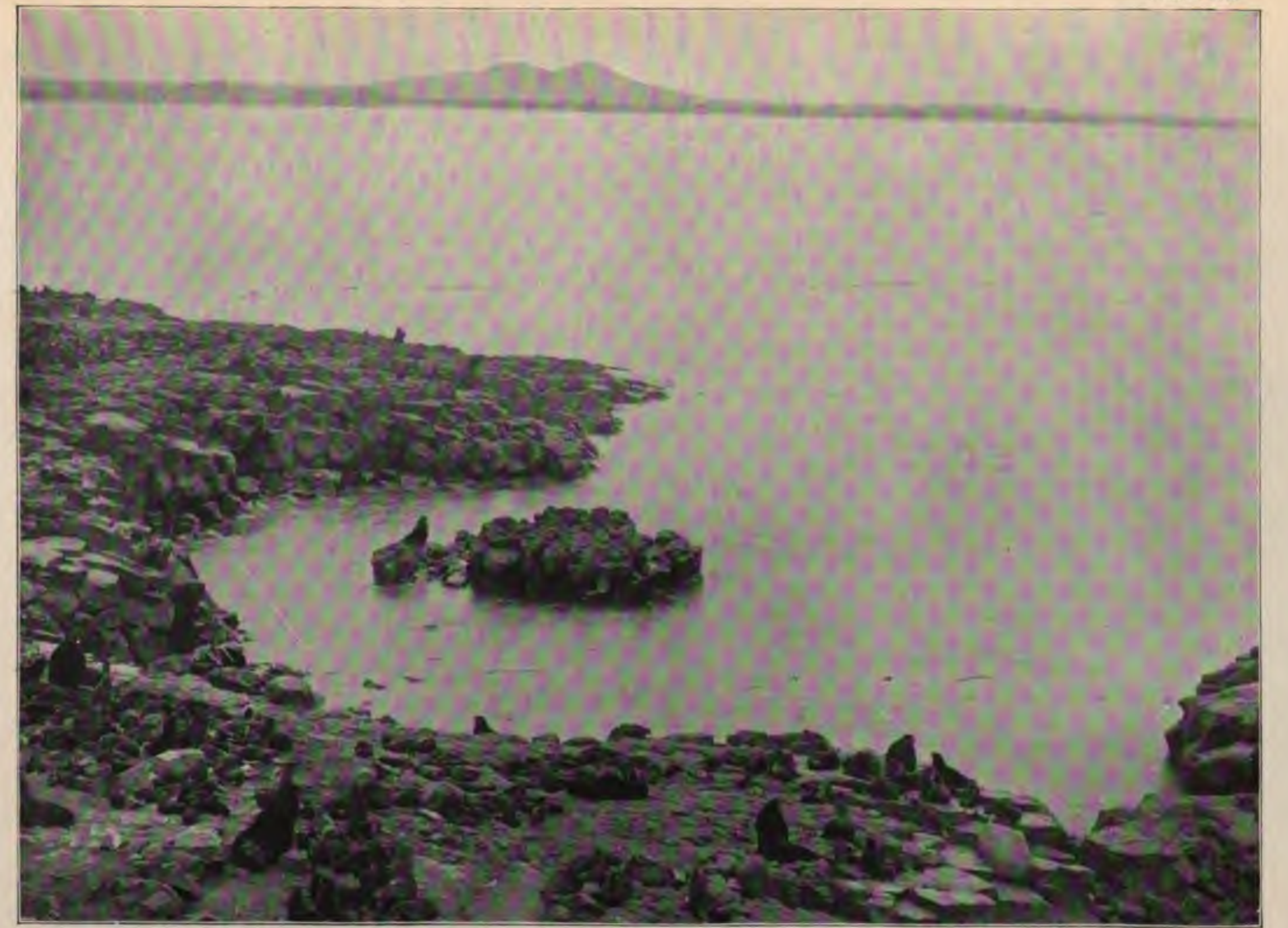
PLATE II *b*.



A VIEW OF THE AMPHITEATER OF KITOVI ROOKERY, SAINT PAUL ISLAND, JULY 13, 1897. (TO BE COMPARED WITH PLATE I.)

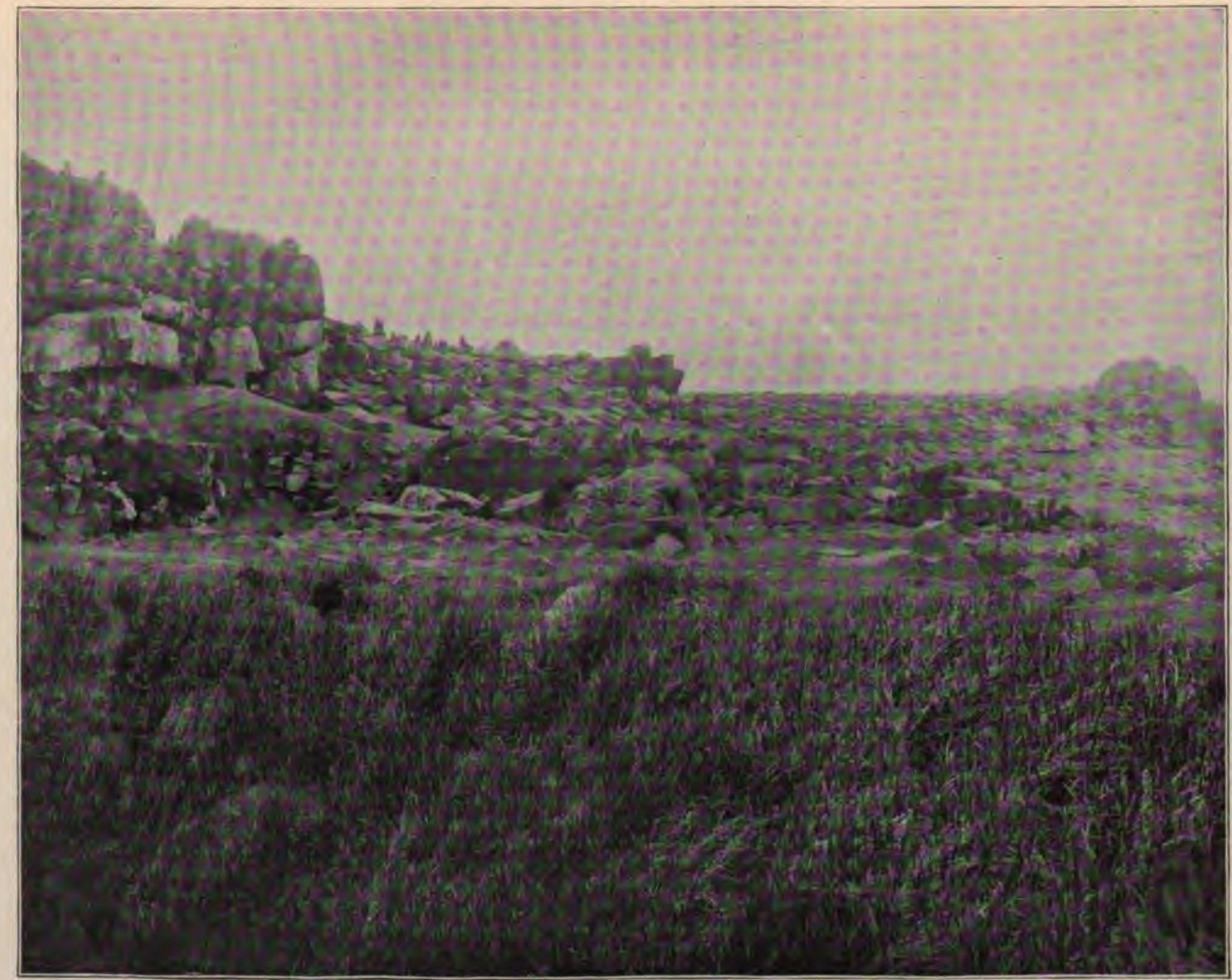
Photograph by Chichester.

PLATE II c.



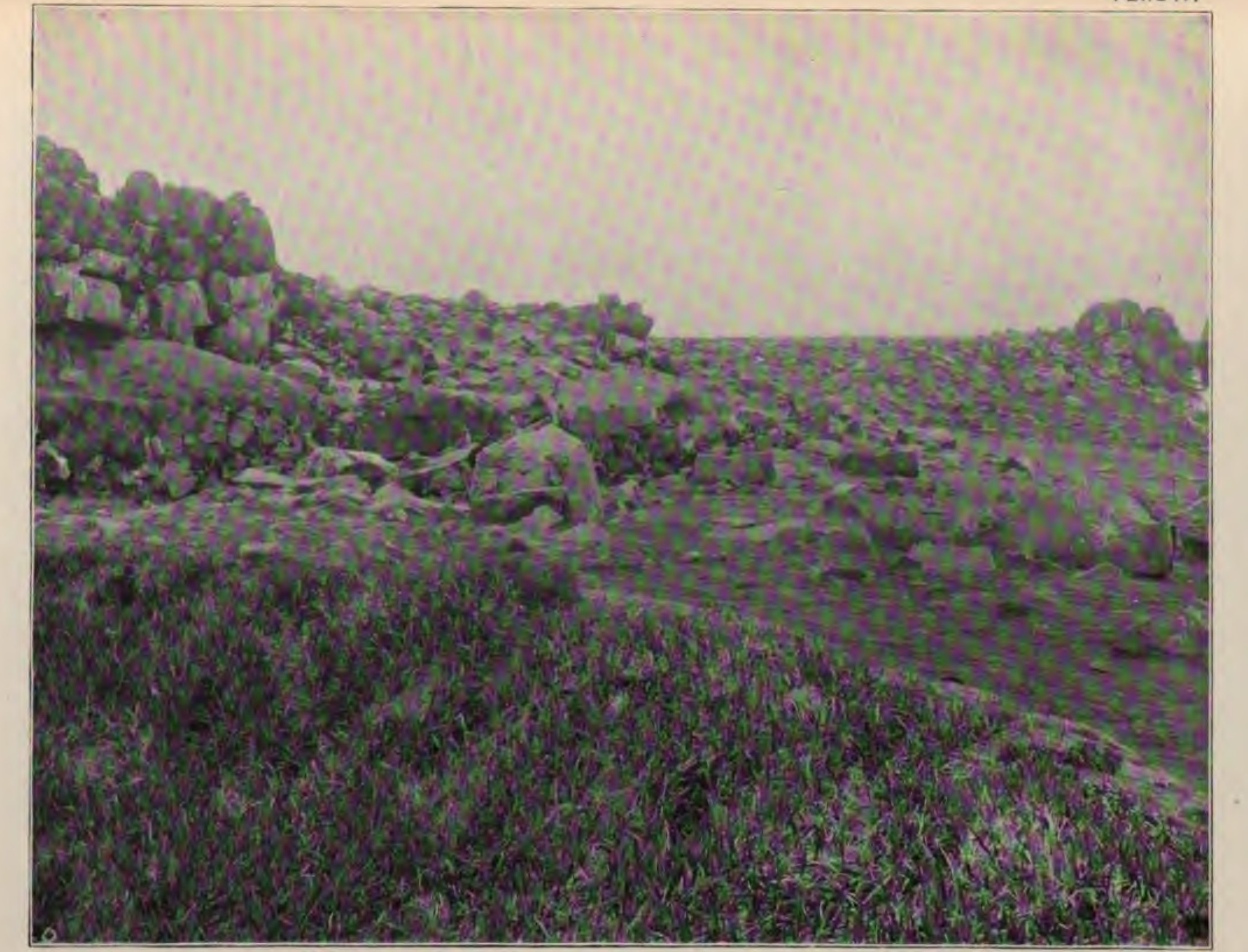
A VIEW OF THE AMPHITHEATER OF KITOVI ROOKERY, SAINT PAUL ISLAND, JULY 13, 1897. (TO BE COMPARED WITH PLATE I.)
Photograph by Chichester.

PLATE III.



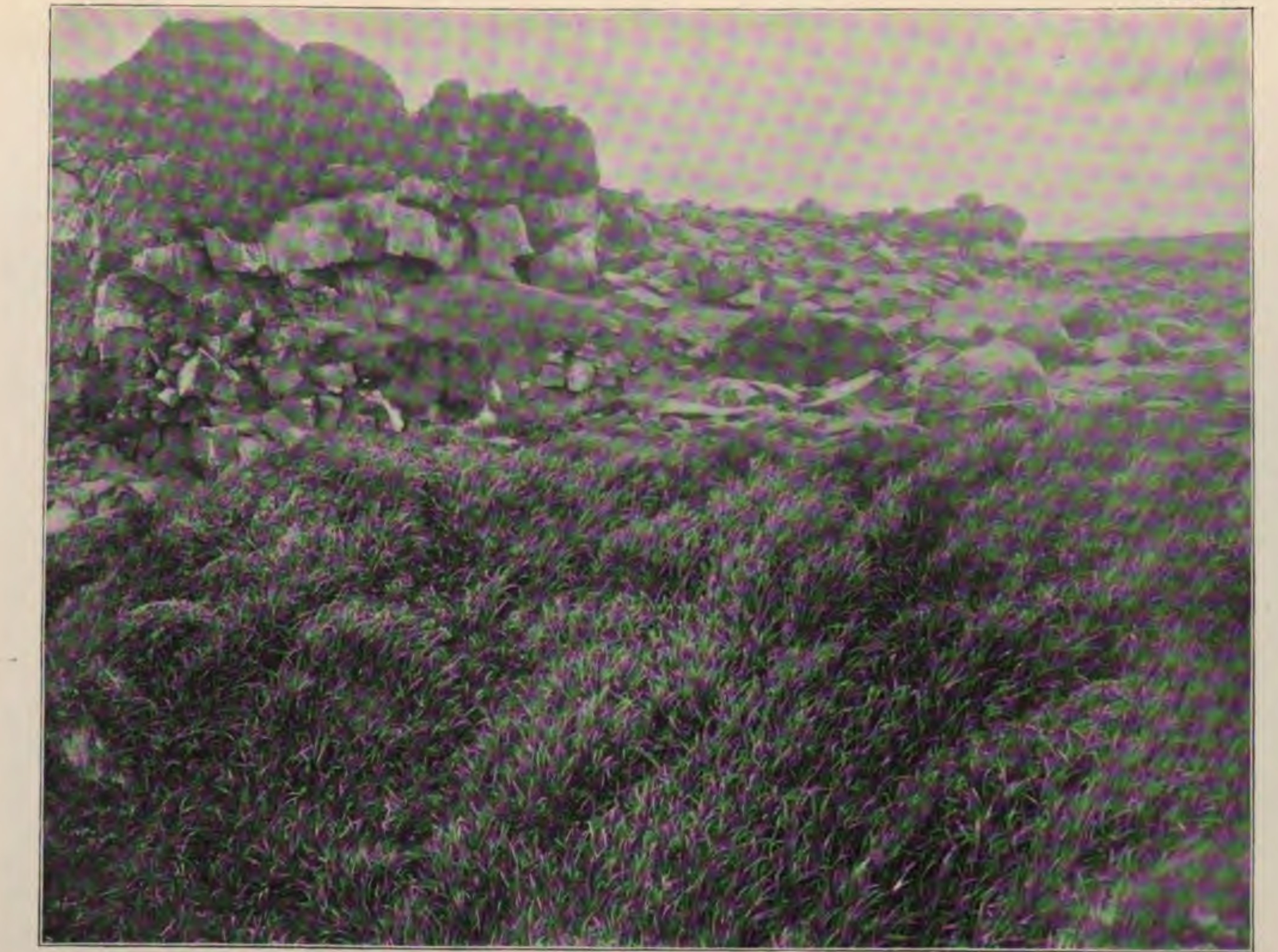
A SECTION OF ARDIGUEN ROOKERY, SAINT PAUL ISLAND, JULY 15, 1894. (TO BE COMPARED WITH PLATE V.)
Photograph by Townsend.

PLATE IV.



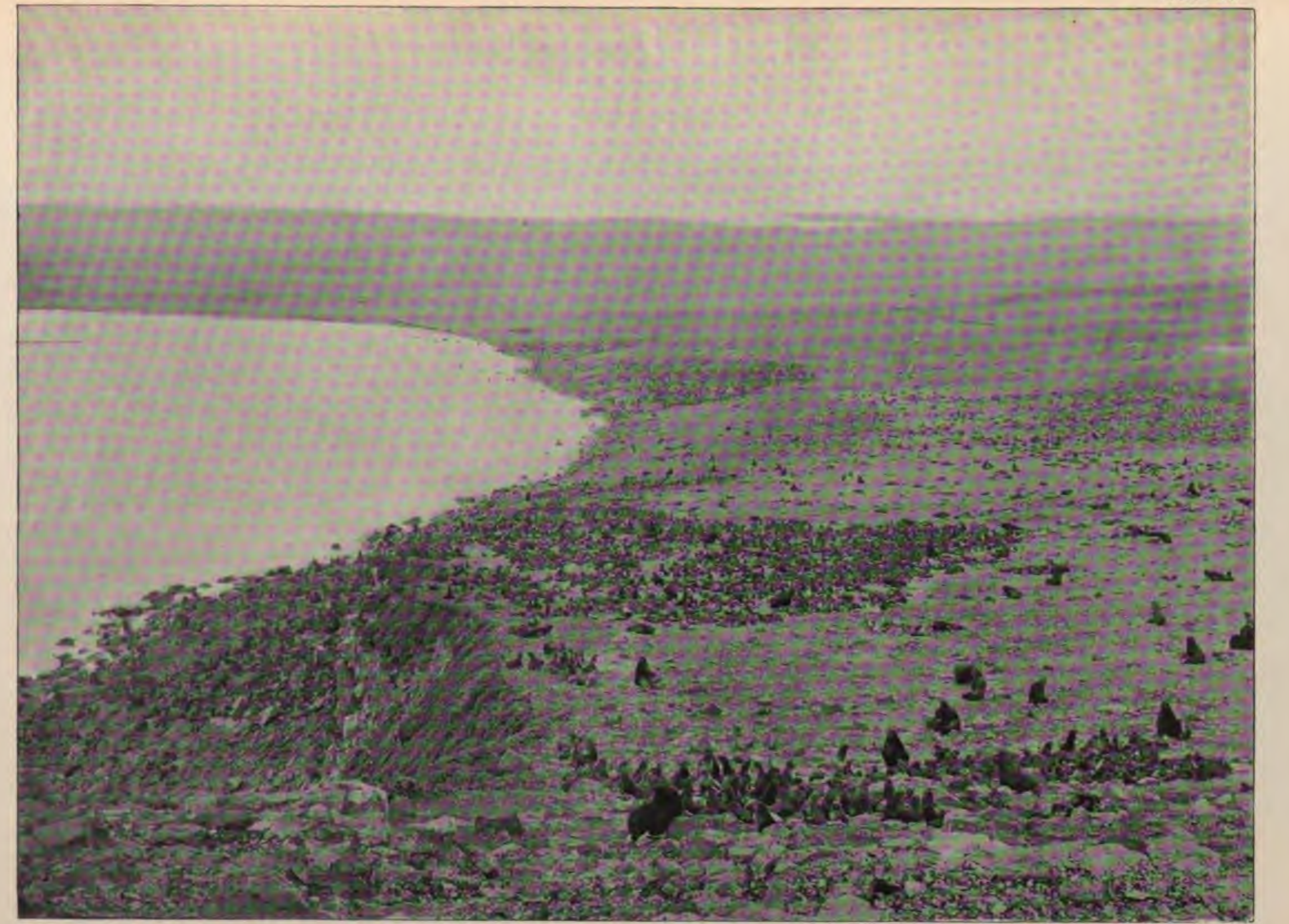
A SECTION OF ARDIGUEN ROOKERY, SAINT PAUL ISLAND, JULY 20, 1895. (TO BE COMPARED WITH PLATES III AND V.)
Photograph by Townsend.

PLATE V.



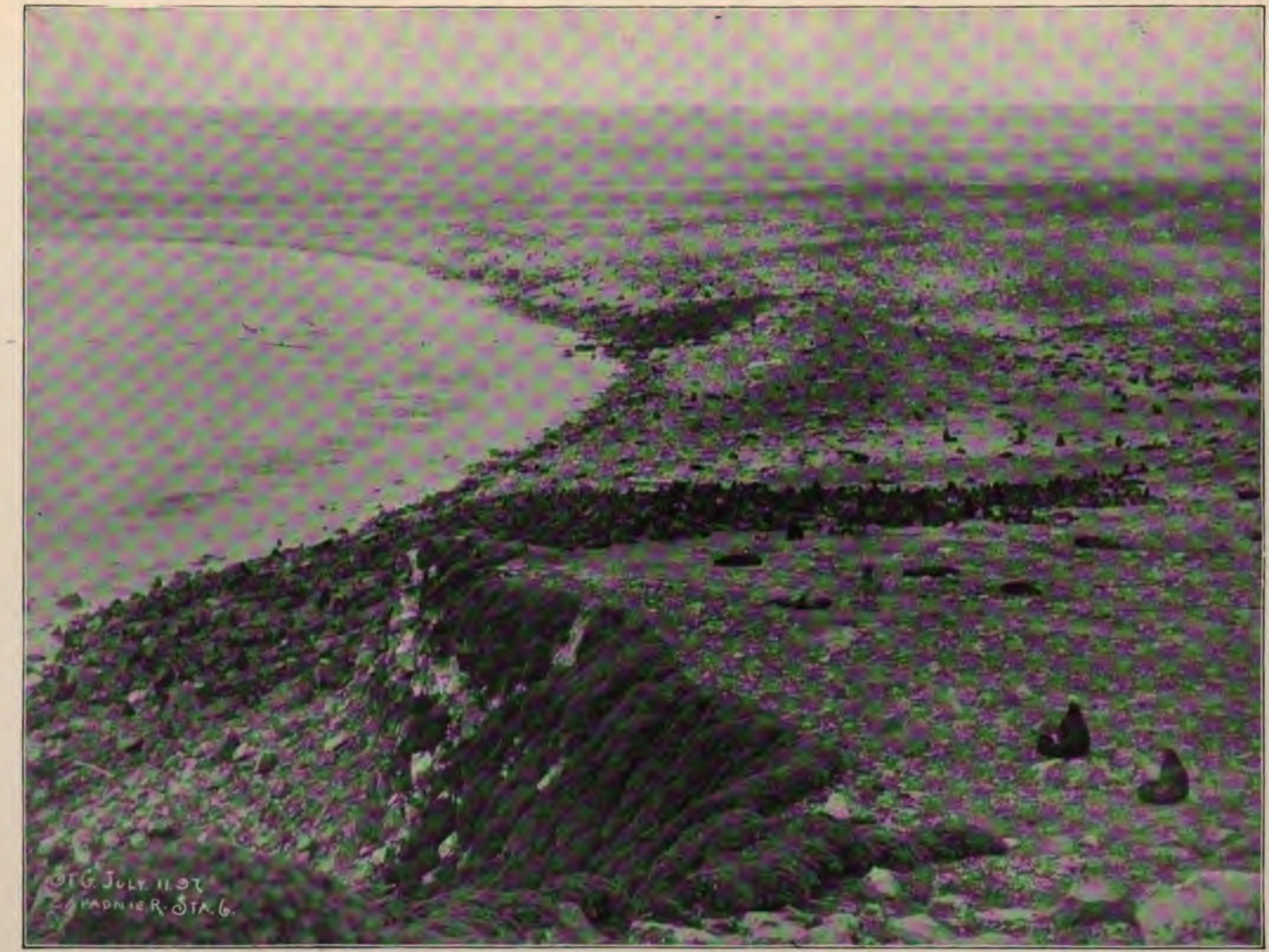
A SECTION OF ARDIGUEN ROOKERY, SAINT PAUL ISLAND, JULY 13, 1897. (TO BE COMPARED WITH PLATE III.)
Photograph by Chichester.

PLATE VI.



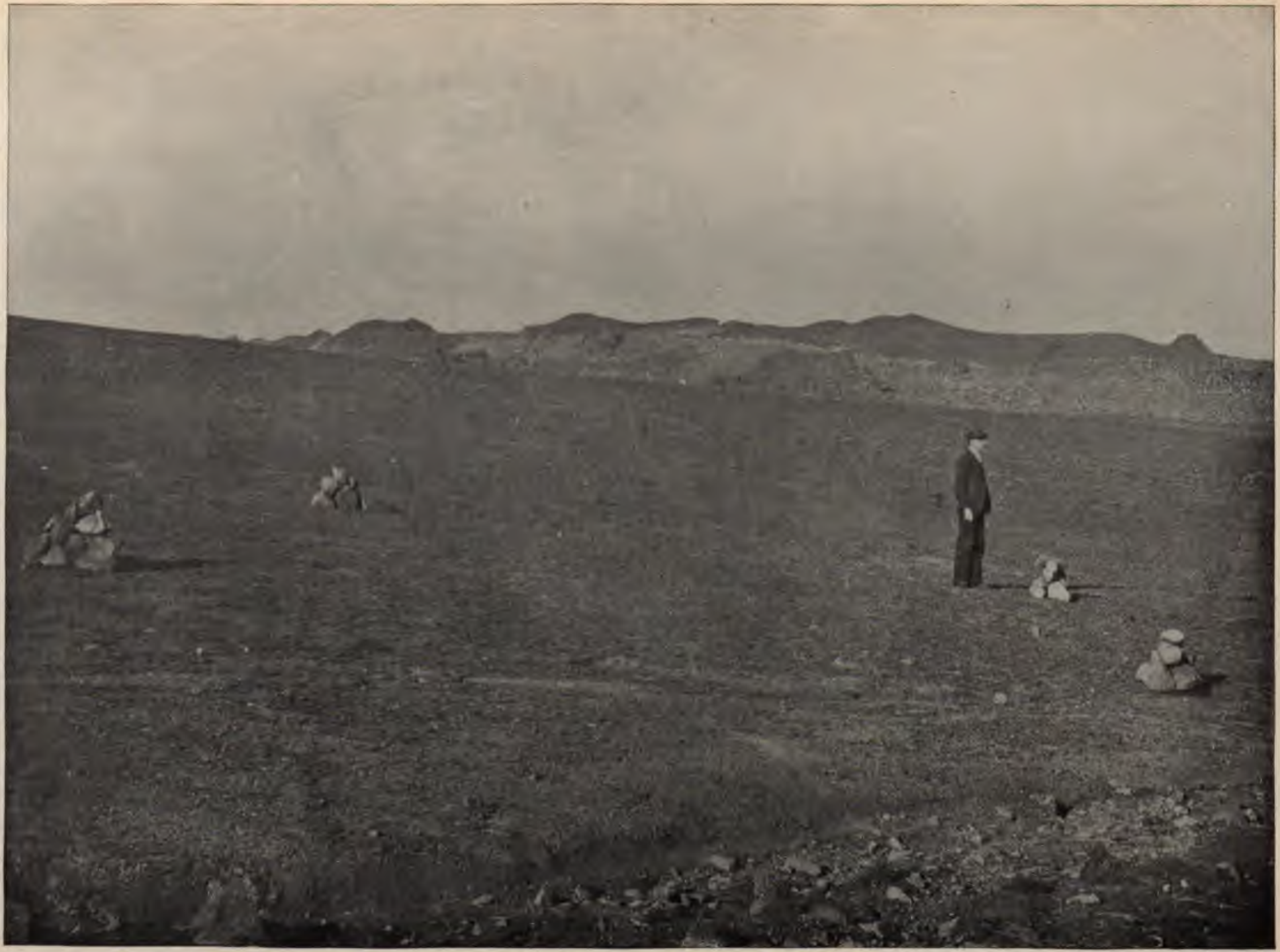
A GENERAL VIEW OF ZAPADNI ROOKERY, SAINT GEORGE ISLAND, JULY 19, 1895. (TO BE COMPARED WITH PLATE VII.)
Photograph by Townsend.

PLATE VII.



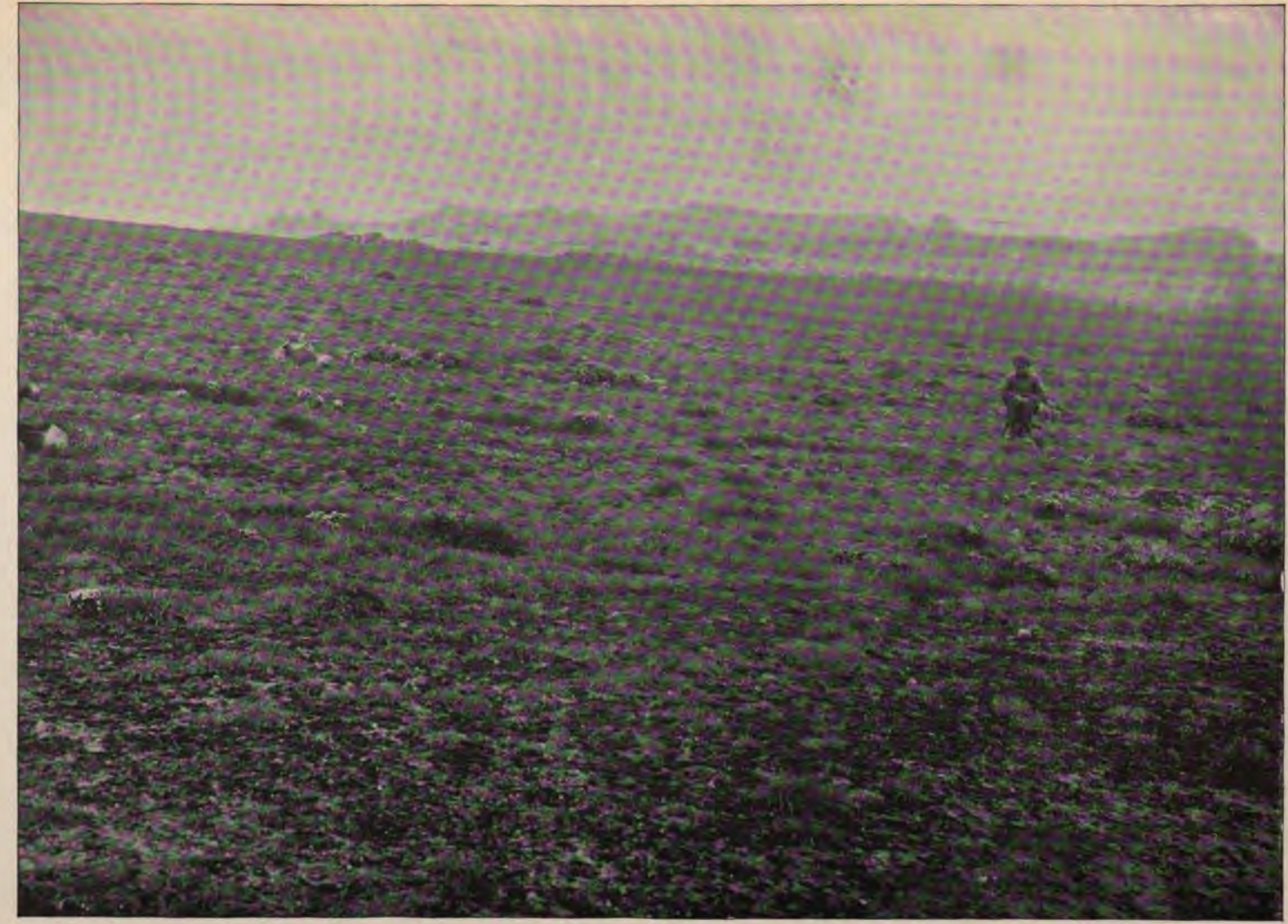
A GENERAL VIEW OF ZAPADNI ROOKERY, SAINT GEORGE ISLAND, JULY 11, 1897. (TO BE COMPARED WITH PLATE VI.)
Photograph by Chichester.

PLATE VIII.



VIEW OF AREA MADE BARE BY THE MOVEMENTS OF THE SEALS IN 1892, GRASS-GROWN IN 1895. (TO BE COMPARED WITH PLATE IX.)

PLATE IX.



VIEW OF AREA MADE BARE BY THE MOVEMENTS OF THE SEALS IN 1892, GRASS-GROWN IN 1895. (TO BE COMPARED WITH PLATE VIII.)

INDEX.

Page.

- Abandonment of—
  - breeding territory, 104
  - cause of, 137, 138
  - Marunichen, 138
  - Spilki, 137
- Acreage measurement—
  - contrast of, 88
  - difficulty of, 75
  - summary of, 88
- Act of Congress, 17
- Actual counts, 90, 109
- Adams, Bristow, 21
- Affidavits of furriers, 244
- Agents, Government, 35, 191
- Alaska Commercial Company, 28
  - lease of, 29, 236
- Alaska, transfer of, 24
- Aleuts, condition of, 34
  - notions of, 139
- Alexander, A. B.:
  - investigations regarding sexes, 155
  - spearing of seals, 144
- Alleged change of habits, 134
- Allen, Dr. J. A, 43, 73
- American contentions, 180
- American fur-seal catch:
  - 1894, 215
  - 1895, 217
  - 1896, 219
  - 1897, 220
- American citizens prohibited from sealing, 176, 246
- American management, 28
- Amphitheater of Kitovi:
  - count of, 54, 212
  - harems on, 54
  - synopsis of counts, 53
- Antarctic seals, 43
- Arbitration Tribunal, 30, 177, 231
  - award of, 231
  - declarations of, 236
  - regulations of, 180, 234
- Arbitrary selection of males, 136
- Arbitration:
  - proposals for, 178
  - treaty of, 179, 228

Page.

- Arctocephalus, 43
- Ardiguen, 39, 107
- Arrival of seals, 49
- Atlantic seals, 43
- Average harem, 90
- Babine, A. V, 37
- Bachelor, the, 46
- Bachelors:
  - landing of, 49
  - of Bering Island, 135
- Bachelor herd, decline of, 29
- Barrett-Hamilton, G. E. H, 18, 125
- Basis of enumeration, 101
- Bayard, Secretary, 177
- Beaman, J. W., counts of, 82, 83
- Bering Island, 119
  - dearth of bulls on, 125
- Bering Sea, sealing in, 143, 146
- Bering, Vitus, second voyage of, 23
- Blaine, Secretary, 178
- Breeding grounds, 36
- Breeding seals:
  - estimate of, 89
  - summary of, 93
- Breeding season:
  - breaking up, 67
  - height of, 53, 54
- British contentions, 87, 153, 154, 159, 161, 162, 163, 168, 180
- Bryant, Capt. Charles, 77, 139
  - estimate for 1869, 77
  - note on Kitovi, 82
- Buckshot in seals, 145
- Bull, the, 46
- Bulls:
  - condition of, 67
  - count of, 100
  - discipline of, 58
  - fasting of, 57
  - fighting of, 52, 59, 60, 61
  - no lack of, 122, 127
  - not impotent, 127
  - proportion of, to cows, 119, 194
  - scarcity of, on Bering Island, 125
  - superfluous, 120

Callorhinus— Page.
  alascanus 45
  curilensis 45
  ursinus 45
Canada:
  interests of 174
  objections of 178
  sealing industry of 176
Canadian fur-seal catch:
  1894 216
  1895 217
  1896 219
  1897 221
Cape Horn seals 226
Carcass-strewn driveways 132
Catastrophe of 1834 25
Categories of seals 46
Cause of decline 116, 150
  not killing of males 123
  pelagic sealing 153
Census of 1896 93, 213
  chief correction in 94
  overestimates in 94
  revised table of 96, 213
  revision of 93
Census of 1897 96, 97, 213
Census of breeding seals, tentative—
  for St. George 91
  for St. Paul 91
Chinese markets, standards of 25
Clark, George A 18, 109
Close season 30, 181
Closed zone 30, 181
Commander Islands:
  discovery of 23
  driveways of 130
  suggested migration to 134
Commission, the 17
Comparative census, 1896–97 213
Conclusions, summary of 184
Condition of herd:
  past 75
  present 90
Conference of experts 188, 240
  findings of 188, 241
Counts of cows and pups:
  1896 92
  1897 96
  count in 1895 85, 86
Cow, the 46
Cows:
  daily counts of 51, 53, 212
  dead 62
  departure of 58
  feeding of 55
  increased mortality in 1897 62, 108
  landing of 51, 52, 60
  treatment by bulls 61

P
Custom-house examination of skins
Daily counts of 1897 51, 52, 53, 54,
Dall, Dr. W. H., notes of
Dawson, Dr. G. M
Dead pups:
  counts of 213,
  decrease of, in 1897
  early death of 70,
  eaten by foxes
  loss of bodies
  on St. Paul 168,
  on St. George 71, 168,
  on death traps
  removal of
  total for 1896 70,
Death traps:
  contrasted counts
  record of
Decline:
  beginning of 102,
  cause of
  evidence of
  history of
  in quota of 1897
  percentages of
  total extent of
Defective skins
Discovery and exploration
Discipline of the harem 58
Dora Siewerd, cruises of
Drive, the
Driving:
  animal driven
  process of
Drives:
  absence of sexual injury
  American
  care exercised on
  comparison of
  fatalities on
  from Northeast Point
  from Reef 117,
  not a factor in decline
  on Commander Islands
  Russian
  shortening of
Early rookery estimates—
  of 1869
  of 1872–1874
  of 1886
  of 1890
  of 1895 85, 86
  reconstruction of 88
  value of 82, 84, 86
East rookery
Effect of pelagic sealing

Page.
Elliott, H. W 34, 35, 77, 79, 126, 136, 138
    estimate of 1872–1874 77
    estimate of 1890 84
    surveys of 79, 80
    unit of space 80
Empty stomachs, explanation of 161
Equilibrium of herd 102, 158
    under pelagic sealing 158, 159
    could not be maintained 159
    exists below commercial ruin 159
Estimates of 1895:
    contrast of 87
    Crowley 86
    Murray 87
    True and Townsend 85
Estimates of 1897:
    bachelors 98
    bulls 98, 100
    cows and pups 98, 100
    idle and half bulls 98
    seals of all classes present 100
    seals dead during season 100
    seals alive in October 100
    yearlings and virgins 99
Excrement of seals 161
Fasting of seals 57
Females, protection of 25
    ease of capture 156
    effect of killing 171, 189
    feeding of 161
    killing of 25, 153, 156
    percentage in pelagic catch 155, 225
    possible abstraction of 157, 243
    preponderance of 154
    skins should be contraband 190
Fighting, of bulls 52, 59, 60, 61
    due to sexual excitement 60
    instinct for 62
Findings of fact 188, 242
Firearms, used in sealing 143
Fixity of habits 134
Food and feeding grounds 68
Food, digestion of 56
Fur-seal herd:
    condition of 26, 88, 89, 100
    importance of 190
    international interest in 173
Fur seal or sea bear 43
Fur-seal question, origin of 177
Future of the herd 188
Gains and losses of the herd 149
Galapagos Islands 74
Gorbatch rookery 39
Grass-grown areas 104
Great Britain, interests of 174
Great killer, the 71

Page.
Gressigrada, suborder of 43
Growth of pelagic catch 149, 150
Guadalupe Island 44
Halkett, A 18, 65, 185
    report on proportion of females 155
    remarks on stagy skins 65
Hamlin, Chas. S 18, 241
Harbors, absence of 32
Harem, the 57
Harem sizes 58
Harems, count on amphitheater 54
    summary of 96, 97
Hauling grounds 36
    not driven 121
    number driven, 1871–1889 123
Historical sketch 23
Home of the fur seals 31
Hooper, Capt. C. L 171, 226
Howes, Osborne 26
Hunting by Indians 142
Hutchinson Hill 37
Ice, obstruction by 25, 49
Idle bulls, estimate of 100
Indiscriminate killing 154
Inquiry, occasion of 17
Inspection, effect of 140
    need of 194
Instructions 18
Interregnum:
    Dall's note on 26
    females not killed in 28
    Howes's notes 26
    methods of killing 27
    number of seals killed 26
Introduction 17
Investigation, the 18, 19
Itinerary:
    1896 20
    1897 21
Jordan, Dr. David S 17, 130
Joint agreement of 1892 115
Joint commission of 1892 179
Joint report of experts, 1897 .... 188, 240
Killable seals 116
Killing season 116
Killing:
    indiscriminate 154
    premature 123
    wasteful 124
Killers 71
Killings:
    at Northeast Point 207
    at Zapadni (St. George) 207
    comparison for 1889 and 1890 124
    for food 25, 121, 124
    land and sea 116, 211

Killings—Continued. Page.
  - on Commander Islands 125
  - operations of 118, 119
  - percentage killed at 50
  - rejected seals at 50
  - summary of 207, 208, 209
- **Killings, daily tables:**
  - 1875 197
  - 1880 199
  - 1886 200
  - 1889 201
  - 1890 202
  - 1891 203
  - 1892–93 204
  - 1894–95 205
  - 1896–97 206
- **Kitovi rookery** 38, 49
  - average harem of 90
  - taken as typical 90
- **Komandorski (Commander) herd** 44
- **Kuril Islands, the** 45
- **Lack of knowledge in past** 191
- **Lagoon rookery** 40
  - apparent increase on 111
- **Land and sea killing:**
  - history of 29
  - statistics of 149, 211
- **Land killing:**
  - confined to males 116
  - effect of 119
  - in 1869 27, 28
  - suspension of 147
- **Law prohibiting American sealers** 246
- **Liebes, Isaac, note on stagy skins** 66
- **Little East rookery** 42
- **Little Zapadni rookery** 40
- **Lobos Island seals** 226
- **Lucas, F. A** 18, 48, 109, 160, 165
- **Lukanin rookery** 38
  - count of 51, 212
- **Management:**
  - American 28
  - Russian 25
  - wasteful 123, 124
- **Macoun, James M** 18, 109, 163, 168
- **Males, killed with impunity** 189, 243
- **Martin, Walter E., deposition of** 245
- **Maruniehen** 41
  - abandonment of 138
- **Massed rookeries** 52
- **Maynard, Lieutenant** 83
- **McIntyre, H. H** 28, 144
- **Middle Hill** 40, 103
- **Migrations** 47
  - period and limits of 48
- **Modus vivendi** 143, 179, 227
  - effect of 147
  - text of 227

Page.
- **Morton, John M** 22
- **Moser, Capt. Jefferson F** 17
- **Murray, Col. Joseph** 18, 170, 197
  - estimate for 1895 87
- **Naturalist, need of** 194
- **Natural mortality** 70, 115, 157, 184, 185
- **Need of continuous expert study** 193
- **Nomenclature of the seals** 46
- **Nonbreeding seals:**
  - estimate of in past 89
  - estimate for 1897 97, 98
- **North American Commercial Company, lease of** 29, 238
- **Northeast Point:**
  - killings at 207
  - rookeries of 37
- **North Pacific, seals of** 44
- **North rookery** 42, 49
- **Noyes, Capt. W. L** 74
- **Old age, death from** 157
- **Old Johns Rock** 108
- **Orca orca** 71
- **Otter Island** 32, 56
  - bachelors on 39
  - harem on 39, 93
- **Overdriving:**
  - has not occurred 127
  - theory of 126
- **Overkilling:**
  - has not occurred 121
  - impracticability of 121
  - possibility of 120
- **Palata drive** 131
- **Parade ground of reef** 38
- **Parasites of seals** 70
- **Paris award** 231
  - results of 177
- **Parrott & Co., expedition of** 26
- **Patrol, cost of** 182
- **Pelage of fur seals** 65
- **Pelagic fleet, value of** 174, 226
  - vessels sealing in award area 225
- **Pelagic catch:**
  - compared with land catch 148
  - decline of 148, 175
  - from Commander herd 148, 151
  - growth of 149
  - relation to land catch 152
  - percentage of females in 154, 155, 225
  - statistics of 149
  - summary of 146, 222
  - summary since 1894 175
- **Pelagic sealing** 142
  - Asiatic waters 147, 151
  - a check 151
  - a suicidal industry 175

Pelagic sealing—Continued. Page.
  a Canadian industry 176
  by Indians 30, 142
  by white men 30, 143
  catch of, since 1894 215–221
  cumulative effect of 171
  destruction of pups by ....
  entry into Bering Sea 30, 142
  expansion of 150
  in Bering Sea 30
  legality of 176
  loss from, total 171
  loss since 1883 171
  loss under the regulations 172
  off northwest coast 146
  possible equilibrium under 156
  prohibited to Americans 176
  prohibition necessary 187
  slaughter of females 187, 189
  summary of statistics 222
  vessels engaged in 143, 225
Period of equilibrium, 1871–1880 102
Personal estimates 83
Phoca ursina 44
Photographs:
  of Tolstoi in 1891 115
  limitations of 106
  relation to counts 106
  value of 105, 107
Pinnipedia, the 43
Policy of seclusion 140
Polovina rookery 37
  early estimates of 82, 83
Polygamous habits of seals 119
Population of rookeries:
  difficulty of estimate 76
  fluctuation of 54
Present condition of herd 90, 100
Promiscuous nursing of pups, theory of 162
Proportion of bulls to cows 119
Protection:
  proposed measures 178
  counter proposition 178
Pribilof, Gerrasim 23
Pribilof herd 44
Pribilof Islands:
  area of 31
  birds of 33
  climate 32
  discovery of 23
  geography of 31
  inhabitants of 33
  latitude and longitude of 31
  mammals 33
  vegetation 33
Pups:
  birth of 55

Pups—Continued. Page.
  counts of, 1896 92
  count of, 1897 96
  death of 70, 158
  dead unborn 160
  dependent upon milk 164
  estimate of starved 169, 170
  excess over cows 92, 96
  excursions of 69
  killing of 25, 124
  play of 163
  podding of 68
  starvation of 160, 165
  starving 166, 167
  stomach examinations 163
  supposed feeding of 163
  swimming of 69
  trampling of 115
Pup, the 47
Questions still unsettled 193
Quinan, Lieutenant, account of shooting seals 145
Quota:
  anticipation of 123
  contraction of 1876–77 and 1882–83 122
  data regarding 123
  date of filling 123
  decrease of in 1897 108
  fixing of 193
  failure of, in 1890 103
  irregular since 1890 151
  measure of breeding herd 114
  of 1871–1889 88
  of 1890 and since 103
  of 1894–95 103
  of 1896–97 .... 88, 111, 112, 113, 209, 210
  relation to breeding herd 88
Recommendation 191
Recounts of live pups 109
Report, divisions of 19
Reef driveway 129
Reef rookery 38
Regulations of Paris award 143, 234
  adapted to work of sealers 181
  effect of 30
  failure of 182
  obligations of 183
  purpose of 183
  revision not adequate 187
  trial period of 182
Rejected seals 98
  skins 124
Remedy for decline 187
Remipedia 43
Revised census of 1896 95
Revision of early estimates:
  of 1872–1874 .... 88, 89
  of 1895 86

Page.
- Rice, George, deposition of 244
- Robben Island herd 45
- Rookeries, the 36
  - determination of boundaries 76
  - formation of 52
  - inspection of 139
  - life on 49
  - names of 36
  - noise of 63
  - obstructed by ice 49
  - unstable population of 78
- Russia, interests of 174
- Russian-American Company 23, 24, 25, 26
- Salisbury, Lord 178
- San Diego, the 142
- Sealing season, beginning of 50, 116
- Seal grass 33, 104
- Seals, species of 45
  - ability to travel 127, 131
  - age of 68
  - arrival of 49
  - attitudes of 64
  - "breaching" 144
  - categories of 46
  - coloration of 64
  - departure of 71
  - enemies of 71
  - fasting of 57
  - fixed habits of 134
  - "finning" 144
  - individual space occupied 80, 81
  - injuries to 68
  - law of distribution 78
  - low intelligence of 134
  - migrations of 47
  - mortality among 70
  - mortality among young 99
  - not affected by man 135, 141
  - nomenclature of 46
  - parasites of 70
  - possibility of driving elsewhere 136
  - rate of travel 72
  - shooting of 144
  - "sleepers" 144
  - sleeping of 63
  - spearing of 144
  - staginess, meaning of 66
  - swimming of 72
  - "travelers" 144
  - wounds of 62
- Sealskin industry, demoralized condition 173, 175
- Sealing of the South Seas 153
- Seizure of vessels 30, 177
- Sex of salted skins 155
- Sex returns:
  - Alexander's report 155

Sex returns—Continued. Page.
  - Halkett's report 156
  - sealing captains' 154
  - customs experts' 155
- Shooting, loss through 145
- Shrinkage of breeding area 107
  - Ardiguen 107
  - Tolstoi sand flat 107
- Sivutch Rock 32, 38
  - estimate of 94
- Sivutch rookery, cause of occupation 138
- Skins:
  - defective 121
  - rejected 124
  - treatment of 119
  - stagy 124
- Slaughter of the seals 190
- Southern fur seals, habits of 73
- South rookery, Bering 125
- Spearheads on rookeries 145
- Spilki, abandonment of 137
  - count of 83
- St. Paul:
  - count of cows 91
  - count of harems 91
  - description of 31
  - rookeries of 36
- St. George, description of 31
  - rookeries of 41
- Stagy season 65
- Starvation of pups 165
- Starved pups, count of 166, 169
  - estimate for 1897 169, 170
- Starving pups, notes on 166, 167
- Steller, George Wilhelm 44
- Stejneger, Dr. L 17, 119, 125
- Summary of killings 207, 208, 209
- Superfluous males 120
- Texts:
  - affidavits of furriers 244
  - Alaska Commercial Company's lease 236
  - arbitration treaty 228
  - declarations of tribunal 236
  - joint conclusions of experts 240
  - law prohibiting sealing 246
  - modus vivendi 227
  - North American Commercial Company's lease 238
  - Paris award 231
  - regulations, the 234
- Theory of overdriving 126
- Thompson, Prof. D'Arcy W 18, 107, 109, 114, 156, 159, 168
- Tingle, estimate of 1886 84
- Tolstoi rookery 40
  - photograph of, 1891 115
- Townsend, C. H 18, 48, 146, 148

INDEX.

Page.
Townsend's crosses 107
Treaties:
  1824–25 24
  1867 24
  1892 .... 179, 228
Trading companies:
  Parrott & Co 27
  Williams & Haven 27
  Hutchinson, Kohl & Co 27
Tripartite agreement of 1888 178
True and Townsend, estimate of 1895 85
Ukase of 1821 24
Uncinaria 70, 116
Undersized seals, killing of 124
United States, interests of 173
Unit of space:
  Elliott's 80
  True and Townsend's 81, 85
Veniaminof .... [illegible]
Vostochni rookery .... [illegible]
Virgin cows 4
Walrus Island 32
Wasteful killing 124
Williams, T. T 174
Weather, effect on sealing 148
Wingfield, reference to letter of 89
Wischhusen, Edmund, deposition of 244
Yanovsky, report of 25
Yearlings 47
Young seals, losses among 99
Zapadni (Medni) drive 130
Zapadni rookery 40
Zapadni (St. George) 41
  killings on 207
Zoltoi 39

To avoid fine, this book should be returned on
or before the date last stamped below

10M—4-47

599.75
U581

Stanford University Libraries
3 6105 011 562 829

STANFORD UNIVERSITY LIBRARIE
STANFORD AUXILIARY LIBRARY
STANFORD, CALIFORNIA 94305-60
(650) 723-9201
salcirc@sulmail.stanford.edu
All books are subject to recall.
DATE DUE

JUN 10 2001
MAR 31 2001